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A COMPREHENSIVE FIELD TEST AND EVALUATION OF AN ELECTRONIC SIGNPOST AVM SYSTEM
Volume II: Appendix

Transportation
OCT 26 1977
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G. W. Gruver

Hoffman Information Identification Inc.
Fort Worth TX 76107

AUGUST 1977
FINAL REPORT

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Prepared for

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URBAN MASS TRANSPORTATION ADMINISTRATION
Office of Technology Development and Deployment
Washington DC 20590

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16. Abstract

A comprehensive test of a direct proximity electronic signpost AVM system was conducted under operational conditions in downtown Philadelphia. Tests involved operation of a test vehicle while operating as a random route vehicle; e.g., police, taxi, and a fixed route vehicle; e.g., a transit bus. During random route tests, the vehicle operated on an unrestricted basis in a designated area in which the Hoffman overlapping signpost AVM system was installed. The vehicle's location was computed every 0.5 second by the AVM system and compared with its actual location at designated "checkpoints" in the random route area. In the random route tests, the system showed the capability of locating the vehicle to within 282 feet, at 95 percent of the sample points under a wide range of urban and environmental conditions.

Fixed route tests involved operation as a transit bus. An odometer and 15 signposts provided the vehicle's location to within 105 feet at 95% of the sample points along a 13 mile route. The time of passage of designated bus schedule "timepoint" was automatically determined to within 11 seconds 95 percent of the time.

This report contains two volumes. Volume I constitutes the test results.

17. Key Words

Automatic Vehicle Location System (AVL),
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Electronic Signpost,
Direct Proximity,
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PREFACE

During the winter of 1976-77, four different techniques for automatically locating land vehicles were tested in both the low- and high-rise regions in Philadelphia, Pa. The tests were carried out by four different companies under separate contracts to the United States Department of Transportation, Transportation Systems Center. The tests were designed to evaluate the techniques for their applicability as location subsystems for automatic vehicle monitoring systems. This document represents one of the contractors' final report. A summary report on all systems tested is available as Report No. UMTA-MA-06-0041-77-2. This report describes the Phase I program which involved the installation and test of the Hoffman AVM System. Dr. George W. Gruver, the program director for Hoffman, prepared the report and personally conducted most of the testing. Ron Waits developed all of the program software and processed the test data. Jerry McKinney was in charge of the location and test equipment deployment and also performed most of the driving during formal tests.

We want to thank all of the technical, program, and contract personnel at the DOT. In particular the personnel in the offices of Messrs Blood, Symes, and Nelson were very helpful and enthusiastic. A special thanks is given to Bernie Kliem, our technical monitor and Joe Herlihy, who helped monitor our test. Also, Mr. Jack Ludwick of the Mitre Corporation helped make our software task much easier. We would also like to thank the many people in the City of Philadelphia who assisted us in deploying and housing our equipment.

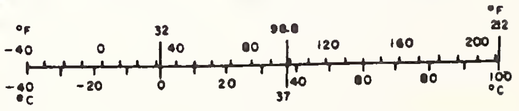
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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1. INTRODUCTION

The application of Automatic Vehicle Monitoring (AVM) to enhance the management of mobile resources has, in recent years, become a subject of continued interest to all types of fleet vehicle operations. Transit, police, cargo, and mining operations have been involved in the development of AVM systems and are currently gathering data pertinent to quantifying the cost/benefits of AVM in a variety of commercial and service operations.

The United States Department of Transportation (DOT) has been interested in AVM for nearly a decade; this interest being directed, in particular, to improving transit and para-transit management activities. Under the sponsorship of the Urban Mass Transportation Authority (UMTA), the DOT is currently attempting to quantify the improvements which AVM can provide to transit, para-transit, and other types of fleet operations. This report contains the interim results obtained by Hoffman Information Identification Inc. (HI^3) of Fort Worth, Texas, as a contractor to the Transportation Systems Center of the DOT on the UMTA Multi-User AVM Contract DOT-TSC-1237. This report covers the activities of Phase I which involved the installation and test of a HI^3 AVM System in the City of Philadelphia during the winter of 1976-1977. These tests represent the most extensive tests ever performed on an AVM system which can locate vehicles which operate either as fixed-route vehicles (transit) or as random-route vehicles (police, para-transit, taxi, etc.).

Volume I of this report contains a description of all test configurations, test procedures, location algorithms, data processing, and test results. This Appendix contains the test log sheets, test data and detailed data processing results corresponding to all Phase I tests.

Section 2 of this Appendix is an executive summary of the Phase I program. Section 3 contains pertinent random-route data and data processing results. Section 4 contains fixed-route data and data processing results.

2. EXECUTIVE SUMMARY

In September 1976, the Transportation Systems Center of the U. S. Department of Transportation entered into contracts with four companies for the design, development and deployment of a multi-user Automatic Vehicle Monitoring (AVM) System which can be deployed in any city. Hoffman Information Identification Incorporated (HI^3) of Fort Worth, Texas, a wholly owned subsidiary of Hoffman Electronics Corporation, was one of these four companies. The program, sponsored by the Urban Mass Transportation Administration (UMTA) is referred to as Multi-User AVM since it is intended to provide AVM benefits to a multiplicity of users, including those fleets of vehicles which generally travel on fixed routes (transit) and those which may travel random routes (taxis, para-transit, dial-a-ride, police, pick-up and delivery, etc.).

The objectives of the Multi-User AVM program were to design, implement, and operate a multi-user AVM system in Los Angeles for the purpose of making a quantitative evaluation of AVM effectiveness, first for transit and para-transit, and second for other AVM users. From the outset, the program was divided into two phases. Phase I, which Hoffman completed on 28 February 1977, involved the demonstration and test of each contractor's vehicle location subsystem in Philadelphia, Pa. Phase II, which will be performed by one of the four contractors, will include the design, development, implementation, test, and operational support of a modern transit management system using a reliable, economical AVM system. The Phase II program will be conducted in conjunction with the Southern California Rapid Transit District (SCRTD) and other users, to be specified, in the Los Angeles area. The primary objective set for Phase I was that of quantifying through formal controlled tests, the ability of each contractor's AVM system to meet specified vehicle location and bus time-of-passage requirements.

The results presented in Volume I of this report show that the HI^3 AVM system proposed for Phase II can provide a transit dispatcher with the location of all buses to within an accuracy of 105 feet 95 percent of the time. The average error in bus location was less than 50 feet for all Phase I tests. As an aid to providing improved service through adherence to schedule, the HI^3 AVM system can provide the time-of-passage of buses to within 11 seconds for 95 percent of the occurrences in which the bus fleet passes predesignated "timepoints." The average time-of-passage error for Phase I was 3.9 seconds. The same HI^3 AVM system can provide a dispatcher with the location of each unit of a fleet of random route vehicles, e.g., police, taxi, etc., to within 282 feet 95 percent of the time.

The overall goal of HI^3 during Phase I was to demonstrate the reliable and accurate performance of the HI^3 nationwide AVM system under conditions to be expected in the operation of a multi-user AVM system in any city in the United States. During previous UMTA AVM development programs, beginning in 1970 with the "Monitor CTA" and including tests of several different location techniques in Philadelphia in 1972, UMTA and TSC developed a high degree of understanding of the requirements for a multi-user AVM system. In establishing the Statement of Work for Phase I, these requirements were translated into an explicit set of vehicle location test requirements. In response to these requirements, HI^3 prepared a Location Subsystem Test Requirements Plan which formed the basis for all Phase I tests, data processing and analyses.

Phase I tests were divided into two primary categories: (1) random route tests, and (2) fixed route tests. Volume I of this report is organized in the same order in which HI^3 tests were conducted. A third category involved special case tests. These tests were conducted at various times throughout Phase I in Fort Worth, Texas, and in Philadelphia, Pa.

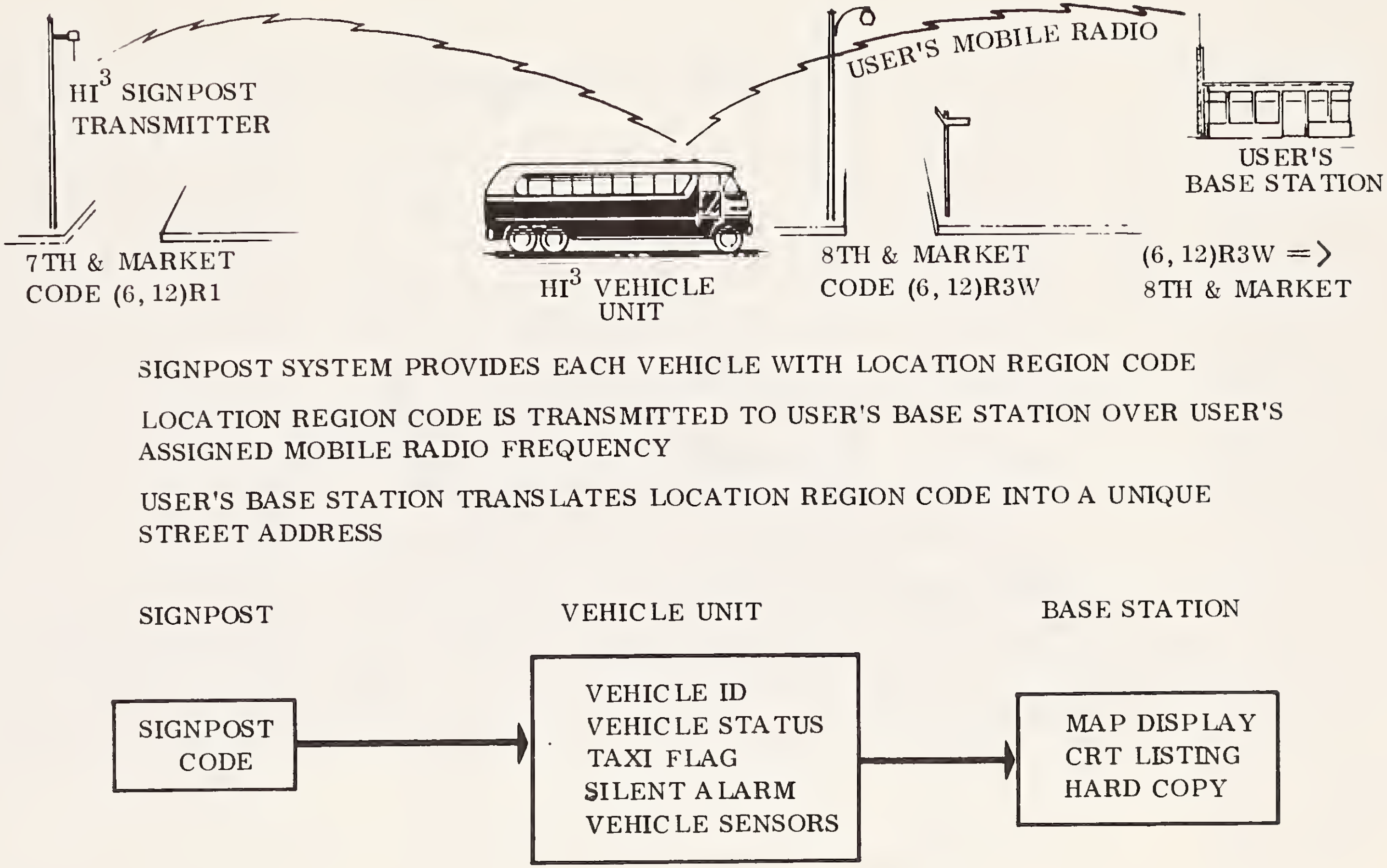
2.1 HI^3 AVM TECHNIQUE

HI^3 proposed to use a direct proximity signpost AVM system during Phase II and all Phase I tests were conducted through the use of Phase II signpost system. As illustrated in Figure 2-1, the HI^3 AVM system receives basic location information, in the vehicle, as a result of the vehicle equipment receiving digitally coded RF transmissions from electronic "signposts." Each signpost transmits a unique 16-BIT code which represents an address (or an X, Y coordinate) in the city analogous to visual street sign identification. The vehicle's proximity to one or more of the signposts results in a simple location region code being stored in the vehicle. This location region code is transmitted to the base station over a mobile radio under base station computer control. At the base station, a simple table look-up by the computer determines a unique street address or X, Y coordinate pair as the vehicle's current location.

HI^3 signposts are battery powered and transmit at a frequency of 49.860 MHz. As a result of the extremely low power output requirements, they may be operated without a license as low power devices under Part 15 of the FCC rules. The use of lithium batteries provides a 7-10 year operating lifetime without battery replacement, and this is achieved over the temperature environment from -55 to 175 degrees F.

When installed in a city, all users (transit, para-transit, taxi, police, pick-up and delivery, etc.) simultaneously share the use of the HI^3 signpost system. This is illustrated in Figure 2-2. Although a number of companies have proposed the use of signposts, a unique feature of the HI^3 approach is the use of overlapping signposts to create additional location regions, thereby reducing the number of signposts required to achieve a specified location accuracy within a given area.

The overlap technique has been previously tested by HI^3 in Los Angeles as part of the Cargo Security System and an overlapping signpost AVM system developed by HI^3 is currently operational in the Huntington Beach, California Police Department. Although proven during those two programs, the UMTA



SIGNPOST SYSTEM PROVIDES EACH VEHICLE WITH LOCATION REGION CODE

LOCATION REGION CODE IS TRANSMITTED TO USER'S BASE STATION OVER USER'S ASSIGNED MOBILE RADIO FREQUENCY

USER'S BASE STATION TRANSLATES LOCATION REGION CODE INTO A UNIQUE STREET ADDRESS

FIG. 2-1 HI^3 MULTI-USER AVM BASIC PRINCIPLE OF OPERATION

DIRECT RF PROXIMITY SIGNPOSTS PROVIDE ALL USER VEHICLES WITH LOCATION ADDRESSES AND ARE BASIC SOURCE OF BUS SCHEDULE INFORMATION.

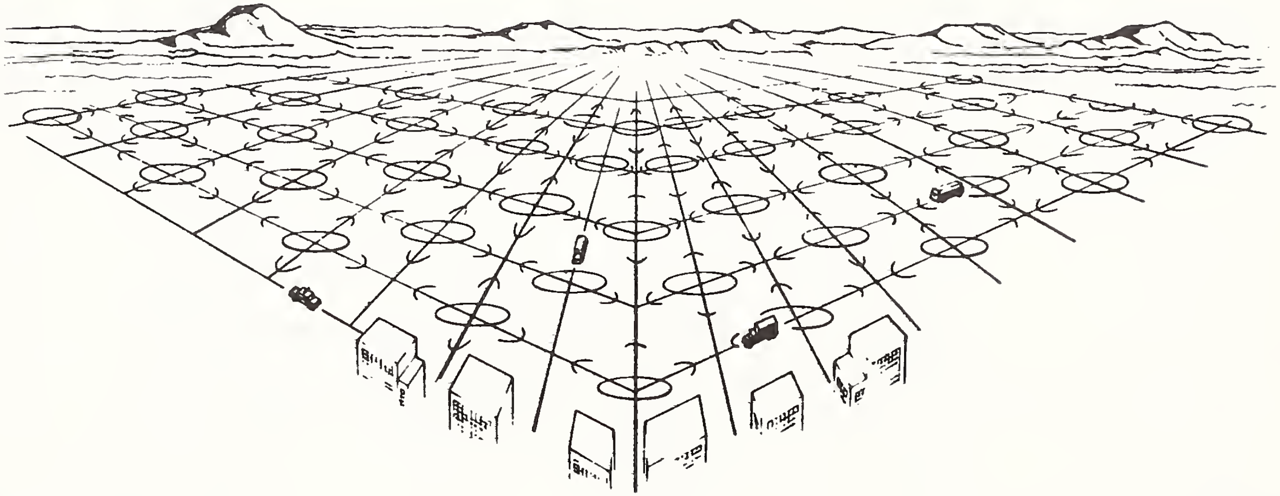


FIG. 2-2 HI^3 MULTI-USER AVM BASIC APPROACH

Phase I test program required the most comprehensive demonstration of the HI^3 overlap technique to date. The results obtained proved conclusively that the HI^3 AVM system proposed for Phase II can meet or exceed all of the location subsystem and system level specifications set forth in the UMTA Multi-User AVM Specification. In addition, the HI^3 AVM system is a nationwide system and can be operated in any city (where 99.99% of users operate) and can be interfaced with a Loran receiver for special "over the road" applications. The nationwide feature is a result of the use of 49.860 MHz which is applicable throughout the United States.

2.2 PHASE I TEST PROGRAM

The Phase I test program involved the installation of a HI^3 AVM location subsystem in Philadelphia to provide random-route coverage of an area and fixed-route coverage of a simulated bus route. The area and the route were selected by TSC. The location subsystem was to provide a basic location accuracy of at least 300 feet at 95 percent and 450 feet at 99.5 percent of all locations in the random route coverage area and along the specified fixed route. In order to establish the performance of the HI^3 location subsystem, a test vehicle, in which was installed a HI^3 AVM vehicle unit, was repeatedly driven over routes selected by TSC while recording on cassettes every half-second, the output of the vehicle unit location register. During each test run, manual event markers were used to mark (record on cassette) the passage of physical landmarks called "checkpoints." Checkpoints were designated by TSC after installation of the location subsystem was complete. The X, Y coordinates of these checkpoints become the reference against which the performance of the AVM system was measured. During off-line data processing, the radial error between the X, Y coordinates of the checkpoint and the X, Y coordinates as computed through use of the AVM technology was computed. For example, during each of 10 random route test runs, each of which was over 11 miles in length, the passage of 62-63 checkpoints was recorded. All information necessary to compute the X, Y coordinates of the vehicle, as determined by the AVM system, were also recorded on cassette. At the end of 10 such runs, the cassettes were processed to determine the location error at each point. The processing was identical to that proposed for Phase II.

Fixed route tests involved the same activities as random route tests, however, an odometer was used to determine the vehicle's location along the fixed route after being automatically reset at signposts spaced approximately one mile apart along the route. In addition to the marking of TSC checkpoints, manual entries were made to document passage of the vehicle by "timepoints" which were designated by TSC to represent typical transit route timepoints. Further, the opening and closing of the door was simulated at approximately one-half of the 15 timepoints on each of 33 fixed route test runs. During off-line processing, the location errors and the errors between the actual time of passage by each timepoint and the time of passage estimated by use of the AVM system were computed. The AVM system was to determine the time of passage of the vehicle at timepoints to ±15 seconds for 95 percent and ±60 seconds for 99.5 percent of all such occurrences.

A total of 10 random route test runs were performed. This resulted in 622 checkpoint samples at which location errors were computed. When these same data were also processed through an AVM system simulation a total of 2235 samples were obtained corresponding to 1 sample every 20 seconds during the 10 runs. This simulation included the injection of communication errors into 5 percent of the samples. The HI^3 Phase II technique for detection and correction of these errors was simulated. Two different random routes were traveled involving passage through tunnels, along narrow streets through high-rise "canyons" and along wide boulevards. All tests were conducted under normal traffic conditions in downtown Philadelphia. A TSC Monitor was in the test vehicle during all tests.

A total of 33 fixed route test runs were performed over a 13 mile route. Each test provided data at 76 checkpoints and 15 timepoints. When processed through the AVM system simulation, a total of 7459 pseudo checkpoint samples were obtained.

Formal demonstrations of the HI^3 AVM system were conducted in Philadelphia on 15 and 28 December 1976 for UMTA personnel and their guests. These demonstrations involved operation of the HI^3 test vehicle in the random route area with 6-8 observers on board. All such demonstrations involved operation as a random-route vehicle with the vehicle location being provided in a real-time on the on-board CRT. All demonstrations were 100 percent successful.

2.3 TEST RESULTS

All random route and fixed route data taken during the Phase I tests were processed by HI^3 to determine the AVM systems performance. Data processing was performed off-line using an exact simulation of the proposed Phase II location subsystem and AVM communication system. These data show conclusively that the HI^3 AVM system can meet or exceed all performance criteria set for Phase II. These results are summarized in Table 2-1.

Figure 2-3 contains cumulative error distributions of random route and fixed route test data results. When translated into an operational system for random route vehicles, these data indicate that under similar urban conditions, a police dispatcher would know, with a 95 percent confidence level, the location of each and every AVM-equipped vehicle to within 282 feet. Similarly, the fixed route data indicates that a bus dispatcher would have at his fingertips the location and schedule performance of every bus on all routes to within 105 feet and to within 11 seconds at a 95 percent confidence level. The application of this information to providing increased service, improved response time, better schedule adherence, etc., forms the basis for the entire Phase II program.

TABLE 2-1 SUMMARY RESULTS OF PHASE I TESTING

LOCATION SUBSYSTEM LOCATION ACCURACY:	Specification (feet)	HI^3 Results (feet)
Random Route: 622 samples		
95% of samples less than	300	242
99.5% of samples less than	450	461
Average error, all samples	---	91
Maximum Average Error Over One-Tenth Mile Segment	450	315
Fixed Route: 2313 samples		
95% of all samples less than	300	107
99.5% of all samples less than	450	156
Average error, all samples	---	50
Maximum Average Error Over One-Tenth Mile Segment:	450	256
AVM SYSTEM LOCATION ACCURACY:		
Random Route: 2235 samples		
95% of samples less than	300	282
99.5% of samples less than	450	464
Average error, all samples	---	114
Fixed Route: 7459 samples		
95% of samples less than	300	105
99.5% of samples less than	450	188
Average error, all samples	---	48
	Specification (seconds)	HI^3 Results (seconds)
AVM TIMEPOINT PERFORMANCE: 451 samples		
95% of samples less than	15	11
99.5% of samples less than	60	24
Average error	--	3.9

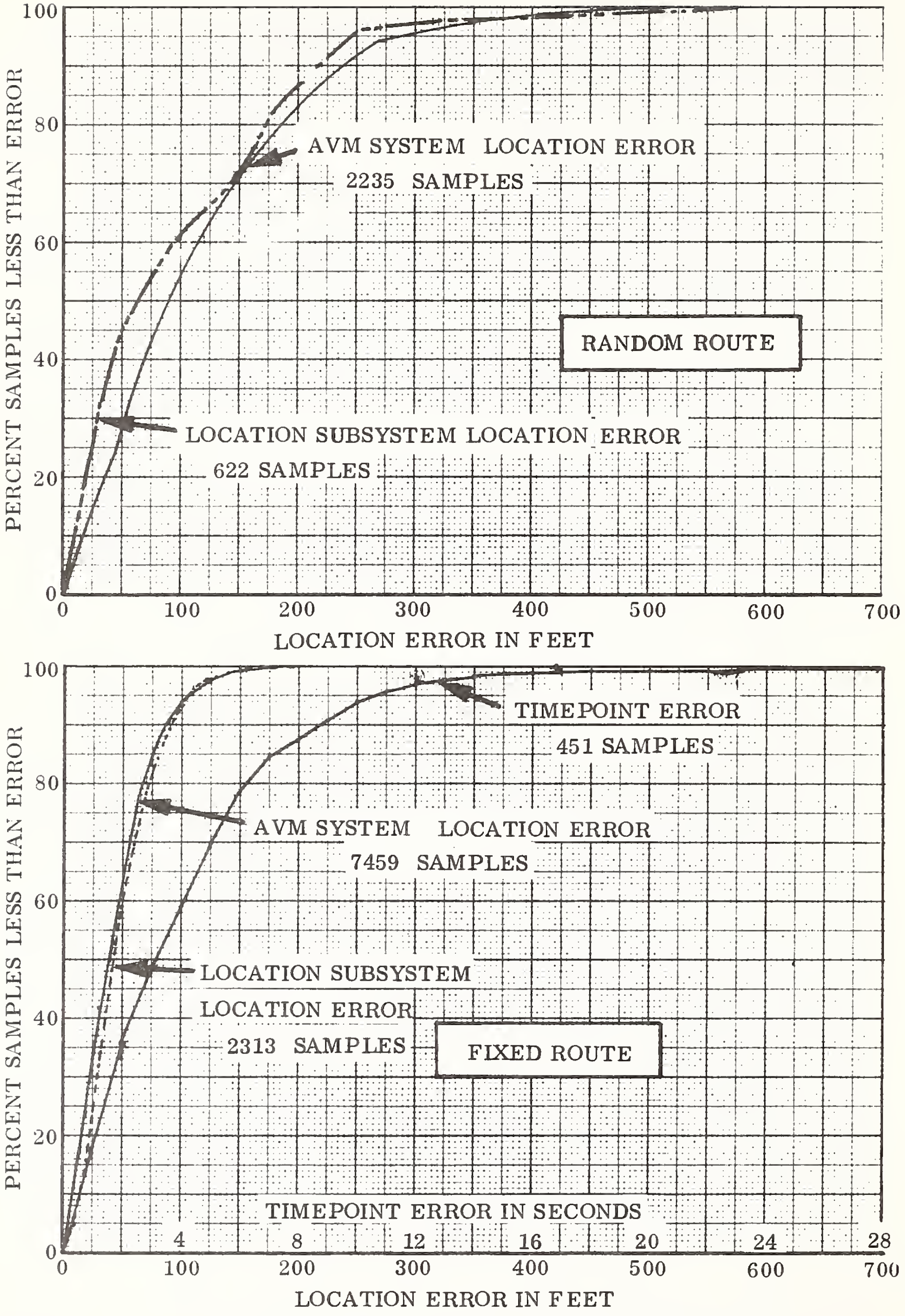


FIG. 2-3 DEMONSTRATED AVM SYSTEM PERFORMANCE

3. RANDOM ROUTE

3.1 RANDOM ROUTE TESTS

3.1.1 Random Route Log Sheets

During each test run, a log sheet was filled out describing the test conditions and any anomalies observed during the test run. Test log sheets for Random Route Runs 1-10 are contained in this subsection.

Hoffman

TEST DATA LOG

TEST RUN NO. 1 SHEET NO. 1 OF 1

TYPE OF TEST: Random Route DATE: 12-7-76 START 1341 COMP. 1715

BRIEF NARRATIVE DESCRIPTION OF TEST RUSH HOUR TRAFFIC. WET STREETS, APPROX 50°F
NO RAIN DURING RUN
ELAPSE TIME 1 HR 34 MIN.

ROUTE IDENTIFICATION: TSC Route (Primary)

EVENT MARKER NUMBER: 1 – 63 IN ORDER:
C.P. 30 EVENT MARKER HIT EARLY (APPROX 75') used EE30
C.P. 45 FOLLOWING TROLLEY
C.P 56 FOLLOWING BUS

Test delayed 24 hours due to discovery of Vehicle Unit audio pass band out of tolerance. Resulted in degraded ability to decode signposts at Temperatures below freezing. Signpost FSK frequencies change with temperature. Vehicle unit was sent to Fort Worth with a signpost to determine problem. Solution is to reset vehicle unit audio passband to provide 6 percent design passband tolerance. Unit was providing only 4% variation in capture band.

Provided TSC monitor following items 4. list of HI^{3} Thru Intersections
1. Listing of Signpost Data Base
2. Map showing current signpost deployment
3. Identification of Primary Checkpoints

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 2

VEHICLE UNIT THRESHOLD LEVELS: 1 -59 dBm 2 -72 dBm 3 -82 dBm

ODOMETER CAL: 997 FPP 2 5TH WHEEL CAL X FPP X

R1 DROPOUT SWITCH: Off/On Off OTHER:

TEMPERATURE: 48° PRECIPITATION: Clear ROAD CONDITIONS: Wet

TEST TAPE NO(S). 1-1 ; 1-2 FILE NO. 1

SAMPLE RATE: 0.5

RUN TIME: 1 hour 34 min

TEST DIRECTOR

TSC MONITOR

TEST DATA LOG

START TIME 1735
END TIME 1848

TEST RUN NO. 2 SHEET NO. 1 OF 1

TYPE OF TEST: Hoffman Random Route DATE: 12-7-76

BRIEF NARRATIVE DESCRIPTION OF TEST TEMP 47°
~~Rush~~ ~~Hour~~ ~~Run~~ STREETS DRY,

ROUTE IDENTIFICATION: TSC Primary

EVENT MARKER NUMBER: 1-63 - IN ORDER - NO ERRORS IN ENTRY

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 2

VEHICLE UNIT THRESHOLD LEVELS: 1 -59dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 997 FPP 2 5TH WHEEL CAL X FPP X

R1 DROPOUT SWITCH: Off/On Off OTHER:

TEMPERATURE: 48°F PRECIPITATION: NONE ROAD CONDITIONS: Wet

TEST TAPE NO(S). 2-1 ; 2-2 FILE NO. 1

SAMPLE RATE: 0.5

RUN TIME: 1 HR. 13 MIN.

TEST DIRECTOR George W [illegible]

TSC MONITOR W. A. [illegible]

TEST DATA LOG

TIME START 1856
Time End 2005

TEST RUN NO. 3
SHEET NO. 1 OF 1

TYPE OF TEST: Hoffman Random Route
DATE: 12-7-76

BRIEF NARRATIVE DESCRIPTION OF TEST
TEMP 46° @ VEHICLE

ROUTE IDENTIFICATION: TSC Primary

EVENT MARKER NUMBER: 1-63
ERROR - AT 2222: TA34 WAS ENTERED INSTEAD OF TA44 CORRECTION MADE BY ENTERING EE34 and entering TA44

EQUIPMENT UTILIZED/TEST CONDITION:
VEHICLE UNIT NO.: 2

VEHICLE UNIT THRESHOLD LEVELS: 1 -59 dBm 2 -72 dBm 3 -82 dBm
ODOMETER CAL: 797 FPP 2 5TH WHEEL CAL X FPP X
R1 DROPOUT SWITCH: Off/~~On~~ Off
OTHER:

TEMPERATURE: 46°
PRECIPITATION: none
ROAD CONDITIONS: Wet
TEST TAPE NO(S). 3-1 ; 3-1
FILE NO. 1
SAMPLE RATE: 0.5
RUN TIME: 1 hour 9 min
TEST DIRECTOR George W Grave
TSC MONITOR Bernd W. A. Klein

TEST DATA LOG

TEST RUN NO. 4 SHEET NO. 1 OF 1

TYPE OF TEST: Huffman Random Route DATE: 12-7-76

BRIEF NARRATIVE DESCRIPTION OF TEST TIME START 2025 END 2150
TEMP 46°F, DRY WINDY.

ROUTE IDENTIFICATION: TSC Primary Route

EVENT MARKER NUMBER: 1-63 in sequence
TIME 31 MIN 41 SEC AT C.P. 25 THRU C.P. 28 TROLLEY CAR
FOLLOWING DIRECTLY BEHIND TEST VEHICLE.

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 2

VEHICLE UNIT THRESHOLD LEVELS: 1 -59 dBm 2 -72 dBm 3 -82 dBm

ODOMETER CAL: 997 FPP 2 5TH WHEEL CAL × FPP ×

R1 DROPOUT SWITCH: Off/On Off OTHER:

TEMPERATURE: 45° PRECIPITATION: none ROAD CONDITIONS: Wet

TEST TAPE NO(S). 4-1, 4-2 FILE NO. 1

SAMPLE RATE: 0.5

RUN TIME: 1 HR-25 MIN. TEST DIRECTOR George W.

TSC MONITOR B.W.A. Klein

TEST DATA LOG

TEST RUN NO. 5 SHEET NO. 1 OF 1

TYPE OF TEST: Hoffman Random Route DATE: 12-7-76

BRIEF NARRATIVE DESCRIPTION OF TEST START 2156 END 2257

TEMP 41°F

ROUTE IDENTIFICATION: TSC Primary

9 MILES 3,559 FEET

EVENT MARKER NUMBER: 1-63 in Sequence

attempted high speed run - limited by traffic lights and turns.

During Runs 1-5 on 12-7-76, the TSC Checkpoint coordinates were not loaded in the data recording Software.

Tapes 5-1 and 5-2 contain previously recorded data, which should be ignored after end of file put on by RANDOM.

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 2

VEHICLE UNIT THRESHOLD LEVELS: 1 -59dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 997 FPP 2 5TH WHEEL CAL Y FPP X

R1 DROPOUT SWITCH: Off/On Off OTHER:

TEMPERATURE: 41°F PRECIPITATION: None ROAD CONDITIONS: Wet

TEST TAPE NO(S). 5-1 and 5-2 FILE NO. 1

SAMPLE RATE: 0.5

TEST DIRECTOR [illegible]

RUN TIME: 1 hour 1 Min

TSC MONITOR [illegible] W.A. Klein

START 0945
End 1055

TEST DATA LOG

TEST RUN NO. 6 SHEET NO. 1 OF 2

TYPE OF TEST: Random Route (Hoffman) DATE: 12-14-76

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: TSC Secondary Random Route

EVENT MARKER NUMBER: 1-62 in order

Test delayed 3 days in order to send Vehicle Unit to Fort Worth to lower clock frequency to compensate for normal drift in signpost VCO frequencies with temperature. Normally, signpost FSK frequencies are set using a standard HI^3 vehicle receiver and field strength meter combination. Signpost operation in temperature chamber is checked with this test unit. HI^3 vehicle units have their clock frequency set at 204KHz as does the test unit. However, the test unit is battery operated and, as a result of the current requirements of the field strength meter, the battery voltage drops to approximately 10 volts, thereby causing the test unit clock frequency to drop to 198KHz. As the signpost operate at lower temperatures this 198KHz frequency provides an adequate capture bandwidth for receiving and decoding the signpost. Since the normal vehicle units operate from the vehicle battery, their voltage remains at approximately 13.5 volts and their clock frequency remains at 204KHz. By testing the vehicle units with cold-soaked signposts, it was found that their clock frequency should be initially set at 198KHz. This adjustment was made and calibration tests made in Philadelphia demonstrated design operation was achieved

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -59dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL X FPP X

R1 DROPOUT SWITCH: Off/On Off OTHER:

TEMPERATURE: 28° PRECIPITATION: None ROAD CONDITIONS: Dry

TEST TAPE NO(S). 6-1 and 6-2 FILE NO. 1

SAMPLE RATE: 0.5

RUN TIME: 1hr 10min

TEST DIRECTOR George W Gruver

TSC MONITOR [illegible] Klein

DISTANCE 9-4280

TEST DATA LOG

TEST RUN NO. 6

SHEET NO. 2 OF 2

TYPE OF TEST: Random Route (Hoffman)

DATE: 12-14-76

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: TSC Route (Secondary)

EVENT MARKER NUMBER: Three signposts coded 19,13; 15,13; and 8,7 were also taken to Fort Worth with the vehicle unit. These signposts were found to be working perfectly and were not modified. On 12-13-76 they were reinstalled at their normal locations.

At approximately 8AM on 12-13-76 the streetlight at the Northeast corner of Race and 9th street was hit by a bus and the HI³ vehicle unit and pole removed by the Philadelphia street light repair crew. As of 1630 on 12-13-76, the disposition of the signpost was being traced by Mr. W. Behrend of the City of Philadelphia Street Lighting Department. HI³ personnel recoded a spare signpost with the code (8,10) of the removed signpost and installed same at 1700 on 12-13-76.

TSC CHECKPOINTS NOT LOADED IN COMPUTER

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1-59 2-72 3-82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL < FPP ^

R1 DROPOUT SWITCH: Off/On off

OTHER:

TEMPERATURE:

PRECIPITATION:

ROAD CONDITIONS:

TEST TAPE NO(S). 6-1 and 6-2

FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W Gruver

RUN TIME:

TSC MONITOR Bernd W. H. Kliem

START 1105
End 1235

TEST DATA LOG

TEST RUN NO. 7 SHEET NO. 1 OF 1

TYPE OF TEST: Hoffman Random Route DATE: 12-14-76

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: TSC Route (Secondary)

EVENT MARKER NUMBER: 1-62 in order

TSC CHECKPOINTS NOT LOADED IN COMPUTER

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -59dBm 2 -72dBm 3 -82 dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL X FPP X

R1 DROPOUT SWITCH: Off/On Off OTHER:

TEMPERATURE: 34° PRECIPITATION: None ROAD CONDITIONS: Dry

TEST TAPE NO(S). 7-1 and 7-2 FILE NO. 2

SAMPLE RATE: 0.5

TEST DIRECTOR George W

RUN TIME: 1 hr 30 min

TSC MONITOR Bernd W A Klum

DISTANCE 9-4340

TEST DATA LOG

12 40
14 00

TEST RUN NO. 8 SHEET NO. 1 OF

TYPE OF TEST: Hoffman Random Route DATE: 12-14-76

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: TSC Route (Secondary)

EVENT MARKER NUMBER: 1-62 in order

TSC CHECKPOINTS NOT LOADED IN COMPUTER

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1-59dBm 2-72dBm 3-82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL X FPP X

R1 DROPOUT SWITCH: Off/On off OTHER:

TEMPERATURE: 36°-33° PRECIPITATION: NONE ROAD CONDITIONS: DRY

TEST TAPE NO(S). 8-1 and 8-2 FILE NO. 1

SAMPLE RATE: 0.5

TEST DIRECTOR George W Gruver

RUN TIME: 1 HR - 29 MIN

TSC MONITOR

DISTANCE 3 - 4137

TEST DATA LOG

14 20
15 35

TEST RUN NO. 9 SHEET NO. 1 OF 1

TYPE OF TEST: Hoffman Random Route DATE: 12-14-76

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: TSC Route (Secondary)

EVENT MARKER NUMBER: 1-62 in order

TSC CHECKPOINTS NOT LOADED IN COMPUTER

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -92dBm 2 -72dBm 3 - 82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL × FPP 5

R1 DROPOUT SWITCH: Off/On Off OTHER:

TEMPERATURE: 58 F PRECIPITATION: NONE ROAD CONDITIONS: DRY

TEST TAPE NO(S). 9-1 and 9-2 FILE NO 1

SAMPLE RATE: 0.5

RUN TIME: 1 HR - 15 MIN.

TEST DIRECTOR George W. Gruver

TSC MONITOR Bernard W. Klein

DISTANCE 5-4170

START 1705
End 1818

TEST DATA LOG

TEST RUN NO. 10 SHEET NO. 1 OF ____

TYPE OF TEST: Hoffman Random Route DATE: 12-14-76

BRIEF NARRATIVE DESCRIPTION OF TEST ____

ROUTE IDENTIFICATION: TSC Route (Secondary)

EVENT MARKER NUMBER: 1-62 in order

TSC checkpoints not loaded in computer

Note: after CP#20 insert: ~~[illegible]~~
Turn right on Wood
Turn right on 10th

~~after CP#32 insert: [illegible] Right on Wood [illegible]~~

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -59dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL x FPP x

R1 DROPOUT SWITCH: Off/On Off OTHER: ____

TEMPERATURE: 36° PRECIPITATION: None ROAD CONDITIONS: Dry

TEST TAPE NO(S). 10-1 and 10-2 FILE NO. 1

SAMPLE RATE: 0.5

RUN TIME: 1hr. 13min

DISTANCE 9mi 4990

TEST DIRECTOR George W Gruver

TSC MONITOR

3.1.2 Random Route Test Data

This subsection contains a complete dump of the data recorded during Random Route Run 7 and the first page of the similar dumps of Runs 1-6 and 8-10. Only those records which contain (1) a change in signpost region code or (2) an event marker are shown in these dumps. A complete dump of every record of Run 4 fills 218 pages.

Primary

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.L CTO:DUMPUM.LDA

.ST14156

RUN 001   SAMPLE RATE 00.5   YEAR 76   MONTH 12   DAY 07   HOUR 15   MIN 41

FIFTH WHEEL FEET/PULSE   0002    ODOMETER FEET/PULSE   0002
TA 064     00     00     R1        O 00000    F 00000    T 02 39
   000     06     12     R1        O 00076    F 00000    T 03 07
CP 001     06     12     R1        O 00189    F 00000    T 03 50
   000     06     12     R2 N      O 00271    F 00000    T 03 59
   000     06     12     R3 N      O 00338    F 00000    T 04 06
   000     08     12     R2 S      O 00360    F 00000    T 04 09
   000     08     12     R3 S      O 00368    F 00000    T 04 10
   000     08     12     R2 S      O 00406    F 00000    T 04 14
   000     08     12     R2 N      O 00483    F 00000    T 04 26
   000     08     12     R1        O 00483    F 00000    T 04 31
   000     08     12     R2 N      O 00483    F 00000    T 04 34
   000     08     12     R2 S      O 00485    F 00000    T 04 54
   000     08     12     R2 N      O 00487    F 00000    T 04 56
   000     08     12     R1        O 00487    F 00000    T 04 57
   000     08     12     R2 N      O 00487    F 00000    T 04 58
   000     08     12     R1        O 00487    F 00000    T 04 59
   000     08     12     R2 N      O 00487    F 00000    T 05 02
   000     08     12     R1        O 00489    F 00000    T 05 04
   000     06     12     R3 N      O 00507    F 00000    T 05 09
   000     08     12     R1        O 00513    F 00000    T 05 10
TA 045     08     12     R1        O 00546    F 00000    T 05 17
   000     08     12     R2 W      O 00652    F 00000    T 05 30
   000     08     12     R2 N      O 00693    F 00000    T 05 35
   000     08     12     R2 W      O 00705    F 00000    T 05 36
   000     08     12     R3 W      O 00712    F 00000    T 05 37
   000     15     16     R2 N      O 00730    F 00000    T 05 41
   000     08     10     R2 E      O 00731    F 00000    T 05 42
   000     15     16     R2 N      O 00741    F 00000    T 05 48
   000     08     10     R3 E      O 00751    F 00000    T 05 50
   000     08     10     R2 E      O 00754    F 00000    T 05 50
TA 044     08     10     R2 E      O 00764    F 00000    T 05 52
   000     15     16     R1        O 00777    F 00000    T 05 55
CP 002     15     16     R1        O 00922    F 00000    T 06 11
   000     15     16     R2 S      O 00937    F 00000    T 06 13
   000     06     12     R3 W      O 01134    F 00000    T 06 44
TA 063     06     12     R3 W      O 01137    F 00000    T 06 45
   000     06     10     R2 E      O 01197    F 00000    T 06 54
   000     06     10     R1        O 01242    F 00000    T 06 59
   000     06     10     R2 E      O 01252    F 00000    T 07 00
   000     06     10     R1        O 01262    F 00000    T 07 01
CP 003     06     10     R1        O 01362    F 00000    T 07 11
   000     06     10     R2 W      O 01480    F 00000    T 07 26
   000     06     10     R1        O 01485    F 00000    T 07 26
CP 004     13     15     R1        O 01602    F 00000    T 07 43
   000     06     10     R3 W      O 01610    F 00000    T 07 44
   000     06     08     R2 E      O 01712    F 00000    T 07 55
   000     06     08     R1        O 01740    F 00000    T 07 58
TA 060     06     08     R1        O 01821    F 00000    T 08 21
TA 050     06     08     R1        O 01986    F 00000    T 08 48
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.L CTO:DUMPUM.LDA          Primary

.ST 14156

RUN 002  SAMPLE RATE 00.5  YEAR 76  MONTH 12  DAY 07  HOUR 17  MIN 31

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
   000    04    12    R3 N   O 00171    F 00000   T 00 37
   000    00    00    R1     O 00000    F 00000   T 00 47
TA 064    00    00    R1     O 00000    F 00000   T 00 54
   000    06    12    R1     O 00115    F 00000   T 01 21
CP 001 ✓  06    12    R1     O 00199    F 00000   T 01 35
   000    08    12    R2 S   O 00399    F 00000   T 01 54
   000    08    12    R1     O 00494    F 00000   T 02 04
TA 045    08    12    R1     O 00551    F 00000   T 02 46
   000    08    12    R2 N   O 00658    F 00000   T 02 59
   000    08    12    R2 W   O 00664    F 00000   T 03 00
   000    08    12    R2 N   O 00669    F 00000   T 03 00
   000    08    12    R2 W   O 00684    F 00000   T 03 02
   000    08    12    R2 N   O 00704    F 00000   T 03 04
   000    08    10    R2 E   O 00750    F 00000   T 03 13
   000    15    16    R2 N   O 00751    F 00000   T 03 15
   000    08    12    R3 W   O 00758    F 00000   T 03 20
TA 044    08    10    R2 E   O 00763    F 00000   T 03 24
   000    15    16    R2 N   O 00767    F 00000   T 03 25
   000    08    12    R3 W   O 00769    F 00000   T 03 26
   000    15    16    R1     O 00782    F 00000   T 03 29
CP 002 ✓  15    16    R1     O 00925    F 00000   T 03 47
   000    15    16    R2 S   O 00979    F 00000   T 03 53
   000    13    16    R3 N   O 01063    F 00000   T 04 03
TA 063    13    16    R3 N   O 01137    F 00000   T 04 27
   000    06    12    R2 W   O 01137    F 00000   T 04 27
   000    06    10    R3 E   O 01141    F 00000   T 04 31
   000    06    10    R2 E   O 01147    F 00000   T 04 33
   000    06    10    R3 E   O 01153    F 00000   T 04 34
   000    06    12    R2 W   O 01164    F 00000   T 04 37
   000    06    12    R3 W   O 01169    F 00000   T 04 38
   000    06    10    R2 E   O 01186    F 00000   T 04 43
   000    06    12    R3 W   O 01258    F 00000   T 04 56
   000    06    10    R2 E   O 01262    F 00000   T 04 58
   000    06    10    R1     O 01263    F 00000   T 04 58
   000    06    10    R3 E   O 01264    F 00000   T 04 59
   000    06    10    R1     O 01264    F 00000   T 05 06
   000    06    12    R3 W   O 01281    F 00000   T 05 33
   000    06    10    R1     O 01284    F 00000   T 05 34
   000    06    10    R2 E   O 01294    F 00000   T 05 35
   000    06    10    R1     O 01310    F 00000   T 05 37
CP 003 ✓  06    10    R1     O 01365    F 00000   T 05 44
   000    06    10    R2 W   O 01475    F 00000   T 05 59
   000    06    10    R1     O 01477    F 00000   T 05 59
   000    06    10    R2 W   O 01485    F 00000   T 06 07
   000    06    10    R1
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.L CT0:DUMPUM.LDA

.ST 14156

RUN 003  SAMPLE RATE 00.5  YEAR 76  MONTH 12  DAY 07  HOUR 18  MIN 56

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 064     00     00     R1      O 00000   F 00000   T 01 13
   000     06     12     R1      O 00096   F 00000   T 01 31
CP 001   ✓ 06     12     R1      O 00207   F 00000   T 01 45
   000     08     12     R3 S    O 00364   F 00000   T 02 01
   000     06     12     R2 N    O 00376   F 00000   T 02 02
   000     06     12     R3 N    O 00381   F 00000   T 02 03
   000     08     12     R2 S    O 00421   F 00000   T 02 06
   000     06     12     R2 N    O 00432   F 00000   T 02 07
   000     08     12     R2 S    O 00438   F 00000   T 02 08
   000     08     12     R1      O 00523   F 00000   T 02 16
TA 045     08     12     R1      O 00553   F 00000   T 02 29
   000     10     12     R3 S    O 00573   F 00000   T 02 57
   000     08     12     R1      O 00595   F 00000   T 03 00
   000     08     12     R2 N    O 00670   F 00000   T 03 09
   000     08     12     R2 W    O 00675   F 00000   T 03 09
   000     08     12     R1      O 00679   F 00000   T 03 10
   000     08     10     R3 E    O 00732   F 00000   T 03 15
   000     08     10     R2 E    O 00762   F 00000   T 03 19
   000     08     10     R3 E    O 00764   F 00000   T 03 20
   000     15     16     R2 N    O 00771   F 00000   T 03 26
TA 044     15     16     R2 N    O 00771   F 00000   T 03 29
   000     08     12     R3 W    O 00771   F 00000   T 03 31
   000   ✓ 15     16     R1      O 00783   F 00000   T 03 42
CP 002     15     16     R1      O 00938   F 00000   T 04 01
   000     15     16     R2 S    O 00962   F 00000   T 04 04
   000     15     00     R3 S    O 01000   F 00000   T 04 09
   000     06     10     R2 E    O 01145   F 00000   T 04 27
   000     06     10     R3 E    O 01147   F 00000   T 04 27
TA 063     06     10     R3 E    O 01152   F 00000   T 04 29
   000     06     10     R2 E    O 01163   F 00000   T 04 31
   000     06     12     R2 W    O 01168   F 00000   T 04 32
   000     06     12     R3 W    O 01177   F 00000   T 04 34
   000     06     10     R2 E    O 01190   F 00000   T 04 36
   000     06     10     R3 E    O 01194   F 00000   T 04 36
   000     06     10     R2 E    O 01205   F 00000   T 04 38
   000     06     10     R1      O 01265   F 00000   T 04 45
   000     06     10     R2 E    O 01274   F 00000   T 04 46
   000     06     12     R3 W    O 01279   F 00000   T 04 46
   000     06     10     R2 E    O 01284   F 00000   T 04 47
   000   ✓ 06     10     R1      O 01289   F 00000   T 04 47
CP 003     06     10     R1      O 01375   F 00000   T 04 56
   000     06     10     R2 W    O 01506   F 00000   T 05 11
   000     06     10     R1      O 01510   F 00000   T 05 12
   000     06     10     R2 W    O 01524   F 00000   T 05 16
   000     06     08     R3 E    O 01588   F 00000   T 05 36
   000   ✓ 13     15     R2 N    O 01605   F 00000   T 05 38
CP 004     13     15     R2 N    O 01616   F 00000   T 05 39
   000     13     15     R1      O 01619   F 00000   T 05 40
   000     06     10     R3 W    O 01623   F 00000   T 05 40
   000     06     08     R2 E    O 01668   F 00000   T 05 47
   000     06     08     R3 E    O 01675   F 00000   T 05 48
   000     06     08     R1      O 01724   F 00000   T 05 54
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.L CTO:DUMPUM.LDA

.ST 14156  Primary

RUN 004   SAMPLE RATE 00.5   YEAR 76   MONTH 12   DAY 07   HOUR 20   MIN 36

FIFTH WHEEL FEET/PULSE   0002   ODOMETER FEET/PULSE   0002
TA 058      00     00     R1       O 00000    F 00000    T 00 37
EE 058      00     00     R1       O 00006    F 00000    T 00 47
   000      06     12     R1       O 00125    F 00000    T 01 04
TA 064      06     12     R1       O 00160    F 00000    T 01 10
CP 001    ✓ 06     12     R1       O 00202    F 00000    T 01 17
   000      08     12     R3 S     O 00369    F 00000    T 01 33
   000      08     12     R2 S     O 00375    F 00000    T 01 34
   000      08     12     R3 S     O 00385    F 00000    T 01 35
   000      06     12     R2 N     O 00406    F 00000    T 01 37
   000      08     12     R3 S     O 00411    F 00000    T 01 37
   000      06     12     R2 N     O 00427    F 00000    T 01 39
   000      08     12     R2 S     O 00437    F 00000    T 01 40
   000      08     12     R2 N     O 00473    F 00000    T 01 43
   000      08     12     R2 S     O 00498    F 00000    T 01 46
   000      08     12     R1       O 00512    F 00000    T 01 47
TA 045      08     12     R1       O 00561    F 00000    T 01 54
   000      08     12     R2 W     O 00685    F 00000    T 02 11
   000      08     12     R2 N     O 00694    F 00000    T 02 12
   000      08     12     R2 W     O 00716    F 00000    T 02 15
   000      10     12     R3 S     O 00728    F 00000    T 02 16
   000      15     16     R2 N     O 00743    F 00000    T 02 18
   000      08     10     R3 E     O 00768    F 00000    T 02 22
   000      08     10     R2 E     O 00771    F 00000    T 02 22
   000      08     10     R3 E     O 00773    F 00000    T 02 23
TA 044      08     10     R3 E     O 00780    F 00000    T 02 24
   000      15     16     R1       O 00787    F 00000    T 02 26
CP 002    ✓ 15     16     R1       O 00935    F 00000    T 02 46
   000      15     16     R2 S     O 00973    F 00000    T 02 52
   000      15     16     R3 S     O 00995    F 00000    T 02 55
TA 063      15     16     R3 S     O 01149    F 00000    T 03 20
   000      06     12     R2 W     O 01155    F 00000    T 03 21
   000      06     12     R3 W     O 01161    F 00000    T 03 23
   000      06     12     R2 W     O 01167    F 00000    T 03 24
   000      06     12     R3 W     O 01172    F 00000    T 03 25
   000      06     10     R2 E     O 01202    F 00000    T 03 30
   000      06     10     R1       O 01255    F 00000    T 03 37
   000      06     10     R3 E     O 01271    F 00000    T 03 39
   000      06     10     R1       O 01275    F 00000    T 03 39
   000      06     08     R3 E     O 01376    F 00000    T 04 21
CP 003      06     08     R3 E     O 01381    F 00000    T 04 22
   000      06     10     R1       O 01386    F 00000    T 04 23
   000      06     10     R2 E     O 01504    F 00000    T 04 38
   000      06     10     R2 W     O 01509    F 00000    T 04 38
   000      06     10     R3 W     O 01578    F 00000    T 05 08
   000      06     08     R2 E     O 01602    F 00000    T 05 12
CP 004    ✓ 13     15     R2 N     O 01608    F 00000    T 05 13
   000      06     08     R2 E     O 01618    F 00000    T 05 14
   000      06     08     R3 E     O 01625    F 00000    T 05 15
   000      06     08     R2 E     O 01644    F 00000    T 05 18
   000      06     10     R3 W     O 01665    F 00000    T 05 20
   000      06     10     R2 W     O 01669    F 00000    T 05 21
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.L CT0:DUMPUM.LDA

.ST 14156

RUN 005  SAMPLE RATE 00.5  YEAR 76  MONTH 12  DAY 07  HOUR 23  MIN 56

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 064     00     00     R1     O 00000    F 00000   T 00 18
EE 064     00     00     R1     O 00000    F 00000   T 00 23
   000     06     12     R1     O 00132    F 00000   T 00 44
TA 064     06     12     R1     O 00185    F 00000   T 01 13
CP 001  ✓  06     12     R1     O 00208    F 00000   T 01 16
   000     08     12     R2 S   O 00461    F 00000   T 01 40
   000     08     12     R1     O 00516    F 00000   T 01 45
TA 045     08     12     R1     O 00556    F 00000   T 01 49
   000     06     12     R3 N   O 00572    F 00000   T 01 52
   000     08     12     R1     O 00575    F 00000   T 01 53
   000     08     12     R2 W   O 00667    F 00000   T 02 04
   000     08     12     R1     O 00672    F 00000   T 02 04
   000     08     12     R2 N   O 00678    F 00000   T 02 05
   000     08     12     R2 W   O 00704    F 00000   T 02 07
   000     08     12     R2 N   O 00709    F 00000   T 02 08
   000     08     12     R3 W   O 00763    F 00000   T 02 15
   000     08     10     R2 E   O 00767    F 00000   T 02 16
TA 044     08     12     R3 W   O 00775    F 00000   T 02 19
   000     15     16     R1     O 00785    F 00000   T 02 21
CP 002  ✓  15     16     R1     O 00943    F 00000   T 02 40
   000     15     16     R2 S   O 00956    F 00000   T 02 42
TA 063     15     16     R2 S   O 01141    F 00000   T 03 04
   000     06     12     R3 W   O 01147    F 00000   T 03 05
   000     06     12     R2 W   O 01156    F 00000   T 03 06
   000     06     10     R2 E   O 01162    F 00000   T 03 07
   000     06     10     R1     O 01254    F 00000   T 03 19
   000     06     10     R2 E   O 01262    F 00000   T 03 20
   000     06     10     R1     O 01274    F 00000   T 03 21
CP 003  ✓  06     10     R1     O 01371    F 00000   T 03 33
   000     06     08     R3 E   O 01478    F 00000   T 03 45
   000     06     10     R1     O 01509    F 00000   T 03 49
   000     06     10     R2 W   O 01510    F 00000   T 03 50
CP 004  ✓  13     15     R2 N   O 01606    F 00000   T 04 18
   000     06     10     R3 W   O 01610    F 00000   T 04 19
   000     06     08     R2 E   O 01642    F 00000   T 04 23
   000     06     10     R3 W   O 01646    F 00000   T 04 24
   000     06     08     R2 E   O 01676    F 00000   T 04 27
   000     06     08     R1     O 01707    F 00000   T 04 31
   000     06     08     R2 E   O 01728    F 00000   T 04 34
   000     06     08     R1     O 01741    F 00000   T 04 35
TA 060     06     08     R1     O 01826    F 00000   T 04 56
TA 050     06     08     R1     O 01981    F 00000   T 05 16
   000     15     14     R1     O 01993    F 00000   T 05 18
CP 005  ✓  15     14     R1     O 02007    F 00000   T 05 21
   000     15     11     R3 E   O 02217    F 00000   T 05 48
TA 049     15     11     R3 E   O 02224    F 00000   T 05 50
CP 006     15     11     R3 E   O 02299    F 00000   T 06 03
   000     15     13     R2 S   O 02353    F 00000   T 06 12
   000     15     13     R3 S   O 02364    F 00000   T 06 16
TA 059     15     13     R3 S   O 02391    F 00000   T 06 21
   000     06     08     R3 W   O 02403    F 00000   T 06 24
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Secondary

B.K. 12/15/76

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.L CTO:DUMPUM.LDA

.ST 14156

RUN 006  SAMPLE RATE 00.5  YEAR 76  MONTH 12  DAY 14  HOUR 09  MIN 45

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
    000    06    12    R1     D 00122    F 00000    T 01 07
 TA 064    06    12    R1     D 00210    F 00000    T 01 16
 CP 001    06    12    R1     D 00239    F 00000    T 01 20
    000    08    12    R3 S   D 00398    F 00000    T 01 33
    000    08    12    R1     D 00495    F 00000    T 01 41
 CP 002    08    12    R1     D 00587    F 00000    T 01 56
    000    08    12    R2 N   D 00702    F 00000    T 02 12
    000    08    12    R1     D 00723    F 00000    T 02 14
    000    08    12    R3 N   D 00733    F 00000    T 02 15
    000    10    12    R1     D 00852    F 00000    T 02 33
    000    10    12    R2 S   D 00857    F 00000    T 02 39
    000    10    12    R1     D 00861    F 00000    T 02 40
    000    10    12    R2 S   D 00877    F 00000    T 02 43
    000    10    12    R1     D 00890    F 00000    T 02 44
 CP 003    10    12    R1     D 00935    F 00000    T 02 50
 TA 029    10    12    R1     D 00998    F 00000    T 02 57
    000    10    12    R2 S   D 01080    F 00000    T 03 04
    000    10    12    R2 N   D 01093    F 00000    T 03 05
 TA 080    10    12    R2 N   D 01119    F 00000    T 03 07
    000    12    12    R1     D 01209    F 00000    T 03 15
 TA 019    12    12    R1     D 01268    F 00000    T 04 17
    000    12    12    R2 W   D 01339    F 00000    T 04 27
    000    12    12    R1     D 01348    F 00000    T 04 28
 CP 004    12    12    R1     D 01352    F 00000    T 04 29
 TA 018    19    16    R2 S   D 01410    F 00000    T 04 37
    000    12    10    R3 E   D 01446    F 00000    T 04 42
    000    19    16    R2 S   D 01478    F 00000    T 04 45
    000    17    16    R2 N   D 01484    F 00000    T 04 45
    000    19    16    R3 S   D 01490    F 00000    T 04 46
    000    17    16    R1     D 01526    F 00000    T 04 49
 CP 005    17    16    R2 S   D 01727    F 00000    T 05 08
    000    17    16    R3 S   D 01787    F 00000    T 05 19
    000    16    16    R2 N   D 01799    F 00000    T 05 21
    000    16    16    R3 N   D 01809    F 00000    T 05 22
    000    16    16    R2 N   D 01855    F 00000    T 05 28
    000    16    16    R1     D 01859    F 00000    T 05 28
    000    16    16    R2 S   D 02017    F 00000    T 05 48
    000    15    16    R3 N   D 02020    F 00000    T 05 49
 TA 044    15    16    R3 N   D 02066    F 00000    T 06 25
    000    15    16    R1     D 02079    F 00000    T 06 28
 CP 006    15    16    R1     D 02088    F 00000    T 06 30
    000    08    10    R3 E   D 02098    F 00000    T 06 32
    000    08    12    R2 W   D 02112    F 00000    T 06 34
    000    08    10    R2 N   D 02184    F 00000    T 06 42
    000    08    10    R1     D 02221    F 00000    T 06 45
    000    08    10    R2 W   D 02372    F 00000    T 06 58
    000    08    10    R1     D 02377    F 00000    T 06 59
 CP 007    08    10    R1     D 02416    F 00000    T 07 03
    000    08    10    R2 W   D 02430    F 00000    T 07 04
```

LISTING OF RECORDED RANDOM ROUTE TEST DATA

```
RUN 007  SAMPLE RATE 00.5  YEAR 76  MONTH 12  DAY 14  HOUR

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
   000  06  12  R1    0 00116  F 00000  T 00 50      000  06  08  R1    0 02997  F 00000  T 11 33
TA 064  06  12  R1    0 00206  F 00000  T 01 37   CF 009  06  08  R1    0 03076  F 00000  T 11 41
CF 001  06  12  R1    0 00262  F 00000  T 01 44      000  06  08  R2 W  0 03182  F 00000  T 11 59
   000  06  12  R2 N  0 00338  F 00000  T 01 51      000  06  06  R3 E  0 03193  F 00000  T 12 02
   000  08  12  R2 S  0 00379  F 00000  T 01 54      000  06  08  R2 W  0 03238  F 00000  T 12 08
   000  06  12  R2 N  0 00403  F 00000  T 01 56      000  06  06  R3 E  0 03295  F 00000  T 12 25
   000  06  12  R3 N  0 00416  F 00000  T 01 57      000  06  06  R1    0 03449  F 00000  T 12 43
   000  06  12  R2 N  0 00452  F 00000  T 02 00   CF 010  06  06  R1    0 03476  F 00000  T 13 14
   000  08  12  R2 S  0 00469  F 00000  T 02 02   TA 058  06  06  R1    0 03529  F 00000  T 13 36
   000  08  12  R1    0 00509  F 00000  T 02 26      000  06  06  R2 N  0 03615  F 00000  T 14 01
CF 002  08  12  R1    0 00582  F 00000  T 02 40      000  08  06  R2 S  0 03692  F 00000  T 14 08
   000  08  12  R2 N  0 00683  F 00000  T 03 14   CF 011  08  06  R2 S  0 03786  F 00000  T 14 20
   000  08  12  R1    0 00687  F 00000  T 03 14      000  08  06  R1    0 03803  F 00000  T 14 33
   000  08  12  R2 N  0 00707  F 00000  T 03 18      000  16  11  R1    0 04042  F 00000  T 15 13
   000  08  12  R1    0 00714  F 00000  T 03 19      000  10  06  R2 S  0 00045  F 00000  T 15 27
   000  08  12  R2 N  0 00717  F 00000  T 03 20      000  10  06  R1    0 00091  F 00000  T 15 54
   000  08  12  R1    0 00720  F 00000  T 03 21   TA 022  10  06  R1    0 00139  F 00000  T 16 00
   000  08  12  R3 N  0 00730  F 00000  T 03 24   CF 012  10  06  R1    0 00155  F 00000  T 16 04
   000  08  12  R2 N  0 00741  F 00000  T 03 26      000  10  06  R2 E  0 00251  F 00000  T 16 28
   000  10  12  R3 S  0 00744  F 00000  T 03 27      000  10  06  R3 W  0 00251  F 00000  T 16 29
   000  08  12  R2 N  0 00761  F 00000  T 04 00      000  10  07  R1    0 00390  F 00000  T 16 54
   000  10  12  R3 S  0 00786  F 00000  T 04 06      000  10  07  R2 W  0 00507  F 00000  T 17 04
   000  10  12  R2 S  0 00848  F 00000  T 04 15      000  10  07  R3 E  0 00523  F 00000  T 17 06
   000  10  12  R1    0 00852  F 00000  T 04 16   CF 013  10  07  R3 E  0 00529  F 00000  T 17 06
   000  10  12  R2 S  0 00856  F 00000  T 04 16      000  10  08  R1    0 00544  F 00000  T 17 08
   000  10  12  R1    0 00860  F 00000  T 04 17      000  10  08  R2 E  0 00795  F 00000  T 17 44
   000  10  12  R2 S  0 00872  F 00000  T 04 18      000  17  15  R2 S  0 00815  F 00000  T 18 05
   000  10  12  R1    0 00883  F 00000  T 04 20      000  16  15  R3 N  0 00818  F 00000  T 18 06
   000  10  12  R2 S  0 00885  F 00000  T  4 21      000  10  08  R2 E  0 00845  F 00000  T 18 09
   000  10  12  R1    0 00888  F 00000  T 04 22      000  10  08  R3 E  0 00868  F 00000  T 18 12
CF 003  10  12  R1    0 00929  F 00000  T 05 16      000  10  10  R2 W  0 00877  F 00000  T 18 13
TA 029  10  12  R1    0 00948  F 00000  T 05 19      000  10  10  R1    0 00994  F 00000  T 18 25
   000  10  12  R2 N  0 01053  F 00000  T 05 30   CF 014  10  10  R1    0 01038  F 00000  T 18 29
   000  10  12  R3 N  0 01116  F 00000  T 05 35      000  10  10  R2 E  0 01188  F 00000  T 18 43
TA 080  10  12  R3 N  0 01123  F 00000  T 05 36   TA 028  10  10  R3 E  0 01263  F 00000  T 19 33
   000  12  12  R2 S  0 01155  F 00000  T 05 38      000  17  16  R2 S  0 01312  F 00000  T 19 39
   000  12  12  R1    0 01222  F 00000  T 05 45      000  16  16  R3 N  0 01327  F 00000  T 19 41
TA 019  12  12  R1    0 01266  F 00000  T 06 01      000  16  16  R2 N  0 01386  F 00000  T 19 46
CF 004  12  12  R1    0 01351  F 00000  T 06 12      000  16  16  R1    0 01392  F 00000  T 19 47
   000  12  12  R2 W  0 01387  F 00000  T 06 16   CF 015  16  16  R1    0 01426  F 00000  T 19 50
TA 018  12  12  R2 W  0 01416  F 00000  T 06 21      000  15  16  R3 N  0 01572  F 00000  T 20 04
   000  19  16  R2 S  0 01426  F 00000  T 06 23      000  15  16  R1    0 01601  F 00000  T 20 06
   000  19  16  R3 S  0 01459  F 00000  T 06 26   CF 016  15  16  R1    0 01693  F 00000  T 20 15
   000  19  16  R2 S  0 01471  F 00000  T 06 27      000  15  16  R2 S  0 01803  F 00000  T 20 25
   000  17  16  R2 N  0 01477  F 00000  T 06 28      000  13  16  R3 N  0 01898  F 00000  T 20 34
   000  17  16  R1    0 01523  F 00000  T 06 31   TA 063  13  16  R3 N  0 01970  F 00000  T 20 43
   000  10  10  R3 E  0 01636  F 00000  T 07 13      000  06  12  R2 W  0 01978  F 00000  T 20 45
   000  17  16  R1    0 01636  F 00000  T 07 14      000  06  10  R3 E  0 01985  F 00000  T 20 46
CF 005  17  16  R1    0 01721  F 00000  T 07 27      000  06  10  R2 E  0 02036  F 00000  T 20 54
   000  16  16  R3 N  0 01801  F 00000  T 07 34      000  06  10  R1    0 02085  F 00000  T 20 58
   000  16  16  R2 N  0 01836  F 00000  T 07 37      000  06  10  R2 E  0 02136  F 00000  T 21 02
   000  16  16  R1    0 01846  F 00000  T 07 38      000  06  10  R1    0 02149  F 00000  T 21 03
   000  15  16  R2 N  0 02011  F 00000  T 07 57      000  06  10  R2 W  0 02320  F 00000  T 22 00
   000  16  16  R3 S  0 02046  F 00000  T 08 03      000  06  08  R2 E  0 02434  F 00000  T 22 45
TA 044  16  16  R3 S  0 02059  F 00000  T 08 06      000  06  10  R3 W  0 02450  F 00000  T 22 47
   000  15  16  R1    0 02070  F 00000  T 08 08      000  13  21  R1    0 02455  F 00000  T 22 47
   000  08  12  R2 W  0 02077  F 00000  T 08 10      000  06  08  R2 E  0 02466  F 00000  T 22 48
CF 006  08  12  R2 W  0 02080  F 00000  T 08 10      000  06  10  R3 W  0 02484  F 00000  T 22 50
   000  08  10  R3 E  0 02087  F 00000  T 08 12      000  06  08  R2 E  0 02502  F 00000  T 22 51
   000  08  10  R2 E  0 02167  F 00000  T 08 21      000  06  08  R1    0 02526  F 00000  T 22 53
   000  08  10  R2 N  0 02173  F 00000  T 08 22      000  06  08  R2 E  0 02574  F 00000  T 22 57
   000  08  10  R2 E  0 02179  F 00000  T 08 22      000  06  08  R1    0 02589  F 00000  T 22 59
   000  08  10  R1    0 02214  F 00000  T 08 26   TA 060  06  08  R1    0 02650  F 00000  T 23 41
CF 007  08  10  R1    0 02408  F 00000  T 08 45   CF 017  06  08  R1    0 02764  F 00000  T 23 57
   000  08  10  R2 W  0 02441  F 00000  T 08 48      000  15  14  R1    0 02824  F 00000  T 24 04
   000  08  10  R3 W  0 02481  F 00000  T 08 57      000  08  08  R2 S  0 02977  F 00000  T 24 20
TA 042  08  10  R3 W  0 02497  F 00000  T 09 03      000  08  08  R1    0 03021  F 00000  T 24 25
   000  15  15  R1    0 02509  F 00000  T 09 06   CF 018  08  08  R1    0 03026  F 00000  T 24 25
   000  16  15  R3 S  0 02522  F 00000  T 09 08      000  16  14  R1    0 03158  F 00000  T 24 41
   000  15  15  R2 N  0 02529  F 00000  T 09 09   CF 019  16  14  R1    0 03282  F 00000  T 25 00
   000  15  15  R1    0 02533  F 00000  T 09 10      000  10  08  R2 W  0 03290  F 00000  T 25 01
CF 008  15  15  R1    0 02674  F 00000  T 09 25      000  10  08  R1    0 03325  F 00000  T 25 05
   000  13  15  R3 N  0 02711  F 00000  T 09 31      000  10  08  R3 W  0 03340  F 00000  T 25 07
   000  13  15  R2 N  0 02830  F 00000  T 11 05      000  10  08  R1    0 03345  F 00000  T 25 07
   000  15  15  R3 S  0 02833  F 00000  T 11 06      000  10  08  R2 N  0 03484  F 00000  T 25 20
   000  13  15  R2 N  0 02838  F 00000  T 11 07      000  10  08  R1    0 03489  F 00000  T 25 20
   000  15  15  R3 S  0 02838  F 00000  T 11 09      000  10  08  R2 N  0 03498  F 00000  T 25 21
TA 061  13  15  R1    0 02856  F 00000  T 11 16      000  12  08  R3 S  0 03515  F 00000  T 25 23
   000  06  10  R2 W  0 02883  F 00000  T 11 21      000  10  08  R2 N  0 03526  F 00000  T 25 24
   000  06  08  R2 E  0 02909  F 00000  T 11 25      000  12  08  R3 S  0 03534  F 00000  T 25 25
   000  06  10  R2 W  0 02915  F 00000  T 11 25      000  12  08  R2 S  0 03549  F 00000  T 25 27
   000  06  08  R2 E  0 02941  F 00000  T 11 28      000  10  08  R3 N  0 03556  F 00000  T 25 28
   000  06  08  R1    0 02952  F 00000  T 11 29      000  12  08  R2 S  0 03558  F 00000  T 25 29
   000  06  08  R2 E  0 02964  F 00000  T 11 30      000  10  08  R3 N  0 03561  F 00000  T 25 30
   000  06  08  R3 E  0 02975  F 00000  T 11 31      000  12  08  R2 S  0 03562  F 00000  T 25 30
```

LISTING OF RECORDED RANDOM ROUTE TEST DATA (CONT'D)

```
   000   10   08   R3 N   0 03564   F 00000   T 25 32     TA 002   19   13   R1     0 02525   F 00000   T 35 08
   000   10   08   R2 N   0 03569   F 00000   T 25 34        000   12   07   R2 E   0 02636   F 00000   T 35 26
   000   12   08   R3 S   0 03570   F 00000   T 25 34        000   19   13   R2 S   0 02637   F 00000   T 35 30
   000   12   08   R2 S   0 03578   F 00000   T 25 38        000   12   07   R2 W   0 02637   F 00000   T 35 36
CF 020   12   08   R2 S   0 03603   F 00000   T 26 15        000   12   07   R2 E   0 02637   F 00000   T 35 36
   000   12   08   R1     0 03610   F 00000   T 26 16        000   19   13   R2 S   0 02637   F 00000   T 35 40
TA 013   12   08   R1     0 03705   F 00000   T 26 28        000   12   07   R2 E   0 02637   F 00000   T 35 43
   000   12   08   R2 W   0 03762   F 00000   T 26 33        000   19   13   R2 S   0 02637   F 00000   T 35 45
   000   12   08   R1     0 03769   F 00000   T 26 34        000   12   07   R2 E   0 02637   F 00000   T 35 46
   000   19   15   R3 S   0 03820   F 00000   T 26 38        000   19   13   R2 S   0 02637   F 00000   T 35 58
   000   12   08   R2 E   0 03876   F 00000   T 27 15        000   12   07   R2 E   0 02637   F 00000   T 36 00
TA 015   12   08   R2 E   0 03891   F 00000   T 27 17        000   19   13   R2 S   0 02637   F 00000   T 36 04
   000   17   15   R2 N   0 03904   F 00000   T 27 19        000   12   07   R2 E   0 02637   F 00000   T 36 04
   000   19   15   R3 S   0 03941   F 00000   T 27 24        000   19   13   R2 S   0 02637   F 00000   T 36 06
   000   17   15   R1     0 03945   F 00000   T 27 24        000   12   07   R2 E   0 02637   F 00000   T 36 06
   000   17   15   R2 N   0 03960   F 00000   T 27 26        000   19   13   R2 S   0 02642   F 00000   T 36 11
   000   17   15   R1     0 03971   F 00000   T 27 27        000   12   07   R1     0 02645   F 00000   T 36 12
   000   19   15   R3 S   0 03981   F 00000   T 27 28        000   12   07   R2 E   0 02653   F 00000   T 36 13
   000   17   15   R1     0 03987   F 00000   T 27 28        000   12   07   R2 W   0 02667   F 00000   T 36 15
CF 021   17   15   R1     0 04052   F 00000   T 27 34        000   12   06   R3 E   0 02671   F 00000   T 36 16
   000   17   15   R3 S   0 00070   F 00000   T 28 20        000   12   07   R2 W   0 02679   F 00000   T 36 17
   000   17   15   R2 S   0 00102   F 00000   T 28 24        000   17   13   R3 N   0 02687   F 00000   T 36 18
   000   16   15   R3 N   0 00121   F 00000   T 28 26     CF 028   17   13   R3 N   0 02696   F 00000   T 36 19
   000   16   15   R2 N   0 00155   F 00000   T 28 29        000   12   07   R2 W   0 02742   F 00000   T 36 24
   000   17   15   R3 S   0 00166   F 00000   T 28 30        000   17   13   R2 N   0 02769   F 00000   T 36 26
   000   16   15   R1     0 00196   F 00000   T 28 32        000   17   13   R1     0 02774   F 00000   T 36 27
CF 022   16   15   R1     0 00308   F 00000   T 29 00        000   10   07   R3 N   0 02885   F 00000   T 37 13
   000   15   15   R3 N   0 00351   F 00000   T 29 11        000   17   13   R1     0 02885   F 00000   T 37 14
   000   15   15   R2 N   0 00434   F 00000   T 29 21        000   10   07   R3 N   0 02885   F 00000   T 37 15
   000   16   15   R3 S   0 00438   F 00000   T 29 22        000   17   13   R1     0 02885   F 00000   T 37 15
   000   15   15   R2 N   0 00448   F 00000   T 29 23        000   10   07   R3 N   0 02885   F 00000   T 37 21
   000   15   15   R3 N   0 00455   F 00000   T 29 24        000   17   13   R1     0 02885   F 00000   T 37 26
   000   15   15   R1     0 00460   F 00000   T 29 25        000   12   07   R3 S   0 02885   F 00000   T 37 33
   000   15   15   R2 S   0 00585   F 00000   T 29 35        000   17   13   R1     0 02885   F 00000   T 37 34
   000   15   15   R1     0 00595   F 00000   T 29 38        000   12   07   R3 S   0 02949   F 00000   T 37 50
TA 052   15   15   R1     0 00603   F 00000   T 29 39        000   17   13   R1     0 02954   F 00000   T 37 50
   000   15   15   R2 S   0 00606   F 00000   T 29 40        000   17   13   R3 S   0 03036   F 00000   T 37 58
   000   15   15   R2 W   0 00626   F 00000   T 29 44        000   17   13   R2 S   0 03077   F 00000   T 38 08
   000   15   14   R3 E   0 00639   F 00000   T 29 46        000   16   13   R3 N   0 03079   F 00000   T 30 08
   000   15   14   R2 E   0 00682   F 00000   T 29 51        000   17   13   R2 S   0 03083   F 00000   T 38 09
CF 023   15   14   R2 E   0 00784   F 00000   T 30 02        000   16   13   R3 N   0 03086   F 00000   T 38 10
   000   15   14   R1     0 00787   F 00000   T 30 03        000   16   13   R1     0 03147   F 00000   T 38 24
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CF 025   15   13   R3 W   0 01250   F 00000   T 31 46        000   16   13   R1     0 03152   F 00000   T 38 30
TA 047   15   13   R3 W   0 01283   F 00000   T 31 56        000   32   27   R1     0 03213   F 00000   T 38 51
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   000   08   06   R1     0 01364   F 00000   T 32 07        000   32   27   R1     0 03213   F 00000   T 38 57
   000   16   11   R1     0 01630   F 00000   T 32 46        000   16   13   R1     0 03213   F 00000   T 38 58
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   000   10   06   R2 N   0 01866   F 00000   T 33 14        000   08   07   R1     0 03310   F 00000   T 39 22
CF 026   10   06   R2 N   0 01882   F 00000   T 33 16        000   16   13   R2 S   0 03319   F 00000   T 39 23
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   000   10   06   R1     0 01913   F 00000   T 33 19        000   08   07   R2 W   0 03323   F 00000   T 39 25
   000   10   06   R2 N   0 01923   F 00000   T 33 20        000   16   13   R3 S   0 03331   F 00000   T 39 30
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   000   10   06   R2 N   0 01962   F 00000   T 33 24        000   16   13   R3 S   0 03331   F 00000   T 39 31
   000   10   06   R3 N   0 01979   F 00000   T 33 26        000   08   07   R1     0 03331   F 00000   T 39 32
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TA 001   14   06   R2 S   0 02308   F 00000   T 34 25        000   15   13   R3 N   0 03331   F 00000   T 39 44
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   000   19   11   R1     0 02322   F 00000   T 34 29        000   15   13   R3 N   0 03331   F 00000   T 39 47
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   000   19   11   R1     0 02358   F 00000   T 34 34        000   15   13   R3 N   0 03331   F 00000   T 39 51
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   000   19   11   R3 E   0 02395   F 00000   T 34 37        000   16   13   R3 S   0 03331   F 00000   T 39 54
   000   19   13   R1     0 02434   F 00000   T 34 43        000   08   07   R1     0 03331   F 00000   T 39 55
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   000   19   13   R1     0 02454   F 00000   T 34 45        000   08   07   R1     0 03347   F 00000   T 40 01
   000   19   13   R2 W   0 02468   F 00000   T 34 47     TA 040   16   13   R3 S   0 03350   F.00000   T 40 02
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LISTING OF RECORDED RANDOM ROUTE TEST DATA (CONT'D)

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   000   08   06   R2 E   0 03426   F 00000   T 40 15
   000   08   06   R3 E   0 03434   F 00000   T 40 16
   000   08   07   R2 W   0 03437   F 00000   T 40 17
   000   08   07   R3 W   0 03444   F 00000   T 40 18
   000   08   07   R2 W   0 03446   F 00000   T 40 19
   000   08   06   R3 E   0 03451   F 00000   T 40 20
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   000   08   06   R3 E   0 03514   F 00000   T 40 27
   000   08   06   R1     0 03525   F 00000   T 40 28
TA 039   08   06   R1     0 03572   F 00000   T 41 11
   000   16   11   R1     0 03729   F 00000   T 41 28
   000   10   06   R1     0 03884   F 00000   T 41 52
CF 030   10   06   R1     0 03908   F 00000   T 41 55
   000   10   06   R2 N   0 03993   F 00000   T 42 06
   000   10   06   R1     0 04001   F 00000   T 42 07
   000   10   06   R2 N   0 04018   F 00000   T 42 09
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   000   10   06   R3 N   0 00007   F 00000   T 42 25
   000   12   06   R1     0 00018   F 00000   T 42 29
CF 031   12   06   R1     0 00051   F 00000   T 42 48
TA 007   12   06   R1     0 00114   F 00000   T 43 48
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   000   12   06   R2 E   0 00238   F 00000   T 44 04
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   000   19   15   R2 S   0 00755   F 00000   T 45 08
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   000   32   31   R1     0 01340   F 00000   T 46 28
   000   15   15   R3 N   0 01356   F 00000   T 46 29
TA 042   15   15   R3 N   0 01419   F 00000   T 46 37
   000   15   15   R2 N   0 01431   F 00000   T 46 39
   000   08   08   R2 E   0 01445   F 00000   T 46 42
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   000   04   03   R3 S   0 01863   F 00000   T 48 24
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CF 037   15   13   R1     0 01970   F 00000   T 49 09
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CF 038   13   13   R3 N   0 02214   F 00000   T 51 56
TA 059   13   13   R3 N   0 02233   F 00000   T 52 00
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   000   08   06   R3 S   0 02623   F 00000   T 53 27
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   000   24   15   R1     0 03750   F 00000   T 55 42
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   000   12   08   R3 W   0 03831   F 00000   T 55 48
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   000   12   07   R3 E   0 03883   F 00000   T 55 51
   000   48   35   R1     0 03891   F 00000   T 55 52
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   000   12   08   R2 E   0 04088   F 00000   T 56 10
CF 041   12   08   R3 E   0 00062   F 00000   T 56 20
   000   19   15   R2 S   0 00125   F 00000   T 56 25
   000   12   10   R2 W   0 00169   F 00000   T 56 29
   000   19   16   R3 W   0 00200   F 00000   T 56 31
   000   12   10   R1     0 00219   F 00000   T 56 33
CF 042   12   10   R1     0 00296   F 00000   T 56 39
TA 017   12   10   R1     0 00336   F 00000   T 56 42
   000   17   16   R3 N   0 00371   F 00000   T 56 45
   000   17   16   R2 N   0 00590   F 00000   T 57 01
TA 028   17   16   R2 N   0 00650   F 00000   T 57 52
   000   16   16   R3 N   0 00698   F 00000   T 57 57
   000   10   12   R2 W   0 00751   F 00000   T 58 01
   000   10   12   R1     0 00812   F 00000   T 58 05
TA 029   10   12   R1     0 00864   F 00000   T 58 25
   000   10   12   R2 N   0 00985   F 00000   T 58 40
TA 080   10   12   R2 N   0 01004   F 00000   T 58 42
   000   10   12   R3 N   0 01029   F 00000   T 58 45
CF 043   10   12   R3 N   0 01041   F 00000   T 58 47
   000   12   12   R1     0 01156   F 00000   T 59 05
TA 019   12   12   R1     0 01183   F 00000   T 59 08
   000   12   12   R2 W   0 01321   F 00000   T 59 26
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LISTING OF RECORDED RANDOM ROUTE TEST DATA (CONT'D)

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   000   12   10   R1     0 01538   F 00000   T 60 07      000   19   13   R3 S   0 00716   F 00000   T 71 32
CP 045   12   10   R1     0 01562   F 00000   T 60 09      000   17   13   R2 N   0 00737   F 00000   T 71 34
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   000   12   10   R3 W   0 01777   F 00000   T 60 24   CP 053   17   13   R1     0 00896   F 00000   T 71 51
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   000   12   08   R2 W   0 01946   F 00000   T 60 39   TA 023   17   13   R1     0 00981   F 00000   T 72 03
   000   12   08   R1     0 01951   F 00000   T 60 40      000   10   07   R1     0 00999   F 00000   T 72 07
   000   12   08   R2 W   0 01966   F 00000   T 60 41      000   10   07   R3 E   0 01126   F 00000   T 72 19
   000   12   08   R1     0 01971   F 00000   T 60 42      000   10   08   R1     0 01136   F 00000   T 72 20
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   000   12   08   R1     0 02074   F 00000   T 60 57   CP 054   10   08   R1     0 01197   F 00000   T 72 54
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CP 046   12   08   R3 N   0 02105   F 00000   T 61 01   TA 026   10   08   R2 E   0 01426   F 00000   T 74 13
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   000   12   08   R3 N   0 02119   F 00000   T 61 03      000   17   15   R2 S   0 01447   F 00000   T 74 16
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TA 004   19   15   R1     0 02394   F 00000   T 62 10      000   16   15   R1     0 01698   F 00000   T 75 32
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   000   17   15   R2 S   0 02898   F 00000   T 64 19      000   13   15   R3 N   0 02082   F 00000   T 76 28
   000   16   15   R3 N   0 02906   F 00000   T 64 20      000   15   15   R2 S   0 02088   F 00000   T 76 29
   000   16   15   R1     0 02965   F 00000   T 64 30      000   15   15   R3 S   0 02093   F 00000   T 76 30
TA 033   16   15   R1     0 03033   F 00000   T 64 38      000   13   15   R2 N   0 02096   F 00000   T 76 31
   000   16   15   R2 W   0 03139   F 00000   T 64 54      000   15   15   R3 S   0 02097   F 00000   T 76 59
   000   16   14   R3 E   0 03150   F 00000   T 64 55      000   13   15   R2 N   0 02109   F 00000   T 77 02
   000   16   14   R1     0 03253   F 00000   T 65 11      000   15   15   R3 S   0 02117   F 00000   T 77 03
   000   16   14   R3 E   0 03265   F 00000   T 65 13      000   13   15   R2 N   0 02127   F 00000   T 77 05
   000   16   14   R1     0 03276   F 00000   T 65 15      000   13   15   R1     0 02137   F 00000   T 77 08
CP 049   16   14   R1     0 03317   F 00000   T 65 20      000   13   15   R2 N   0 02138   F 00000   T 77 08
   000   16   14   R2 W   0 03376   F 00000   T 65 27    A 061   13   15   R2 N   0 02141   F 00000   T 77 10
   000   16   13   R2 E   0 03381   F 00000   T 65 28      000   13   15   R1     0 02144   F 00000   T 77 11
CP 050   08   07   R3 N   0 03399   F 00000   T 65 30      000   06   08   R3 E   0 02147   F 00000   T 77 17
   000   16   13   R2 E   0 03416   F 00000   T 65 32      000   13   15   R1     0 02150   F 00000   T 77 18
   000   16   13   R1     0 03435   F 00000   T 65 34    P 056   13   15   R1     0 02151   F 00000   T 77 18
   000   10   06   R3 S   0 03653   F 00000   T 66 58      000   06   10   R3 W   0 02162   F 00000   T 77 21
CP 051   10   06   R3 S   0 03657   F 00000   T 66 59      000   06   10   R2 W   0 02167   F 00000   T 77 22
   000   16   11   R1     0 03687   F 00000   T 67 02      000   06   08   R2 E   0 02175   F 00000   T 77 24
TA 030   16   11   R1     0 03710   F 00000   T 67 13      000   06   08   R3 E   0 02191   F 00000   T 77 26
   000   10   06   R1     0 03839   F 00000   T 67 39      000   06   08   R2 E   0 02216   F 00000   T 77 29
   000   10   06   R2 N   0 03974   F 00000   T 67 51      000   06   08   R1     0 02258   F 00000   T 77 33
   000   12   06   R3 S   0 04029   F 00000   T 67 57      000   06   08   R2 E   0 02264   F 00000   T 77 34
   000   10   06   R2 N   0 04042   F 00000   T 67 59      000   06   08   R1     0 02281   F 00000   T 77 35
   000   10   06   R3 N   0 04046   F 00000   T 67 59   CP 057   06   08   R1     0 02366   F 00000   T 78 20
   000   12   06   R2 S   0 04050   F 00000   T 68 00      000   06   08   R2 W   0 02436   F 00000   T 78 30
   000   12   06   R1     0 00003   F 00000   T 68 06      000   06   08   R1     0 02444   F 00000   T 78 31
   000   12   06   R2 N   0 00196   F 00000   T 69 21      000   06   08   R2 W   0 02575   F 00000   T 78 49
   000   14   06   R3 S   0 00201   F 00000   T 69 22      000   06   06   R3 E   0 02575   F 00000   T 78 52
   000   14   06   R2 S   0 00250   F 00000   T 69 28      000   06   08   R2 W   0 02575   F 00000   T 78 56
   000   12   06   R2 N   0 00258   F 00000   T 69 29      000   06   06   R3 E   0 02575   F 00000   T 78 57
   000   12   06   R3 N   0 00261   F 00000   T 69 30      000   06   06   R1     0 02708   F 00000   T 79 20
TA 001   12   06   R3 N   0 00270   F 00000   T 69 31      000   06   06   R2 E   0 02714   F 00000   T 79 21
   000   14   06   R2 S   0 00272   F 00000   T 69 32      000   06   06   R1     0 02726   F 00000   T 79 22
   000   19   11   R1     0 00275   F 00000   T 69 32   CP 058   06   06   R1     0 02768   F 00000   T 79 26
   000   19   13   R3 W   0 00339   F 00000   T 69 41   TA 058   06   06   R1     0 02821   F 00000   T 80 08
   000   19   13   R1     0 00400   F 00000   T 69 47      000   15   11   R1     0 03058   F 00000   T 80 59
TA 002   19   13   R1     0 00493   F 00000   T 70 07      000   06   06   R1     0 00190   F 00000   T 85 15
CP 052   19   13   R1     0 00539   F 00000   T 70 21   TA 058   06   06   R1     0 00272   F 00000   T 85 38
   000   12   07   R1     0 00607   F 00000   T 70 29   CP 059   06   06   R1     0 00322   F 00000   T 86 06
   000   19   13   R2 S   0 00616   F 00000   T 70 31      000   06   06   R2 E   0 00367   F 00000   T 86 11
   000   12   07   R2 E   0 00639   F 00000   T 71 24      000   06   06   R3 E   0 00397   F 00000   T 86 48
   000   19   13   R3 S   0 00647   F 00000   T 71 25      000   06   06   R2 E   0 00421   F 00000   T 86 51
   000   12   07   R2 W   0 00652   F 00000   T 71 25      000   06   06   R3 E   0 00468   F 00000   T 86 55
   000   17   13   R3 N   0 00666   F 00000   T 71 27      000   06   08   R1     0 00625   F 00000   T 87 09
   000   12   07   R2 W   0 00670   F 00000   T 71 27   CP 060   06   08   R1     0 00723   F 00000   T 87 21
```

LISTING OF RECORDED RANDOM ROUTE TEST DATA (CONT'D)

```
    000     06     08     R2 E     0 00886     F 00000     T 88 39
    000     06     08     R3 E     0 00904     F 00000     T 88 42
    000     06     08     R2 E     0 00909     F 00000     T 88 43
    000     13     15     R1       0 00941     F 00000     T 89 23
    000     06     08     R3 E     0 00944     F 00000     T 89 24
    000     06     08     R2 E     0 00970     F 00000     T 89 27
    000     06     10     R3 W     0 00977     F 00000     T 89 28
    000     06     10     R2 W     0 01000     F 00000     T 89 31
    000     06     08     R3 E     0 01009     F 00000     T 89 33
    000     06     10     R2 W     0 01012     F 00000     T 89 33
    000     06     10     R3 W     0 01023     F 00000     T 89 41
    000     06     10     R2 W     0 01036     F 00000     T 89 56
    000     06     10     R1       0 01047     F 00000     T 90 03
    000     06     10     R2 W     0 01047     F 00000     T 90 08
    000     06     10     R1       0 01047     F 00000     T 90 41
    000     06     10     R2 W     0 01047     F 00000     T 90 43
    000     06     10     R1       0 01047     F 00000     T 90 44
    000     06     10     R2 W     0 01047     F 00000     T 90 49
    000     06     10     R1       0 01047     F 00000     T 90 57
    000     06     10     R2 W     0 01047     F 00000     T 90 59
    000     06     10     R1       0 01047     F 00000     T 91 02
    000     06     10     R2 W     0 01047     F 00000     T 91 04
    000     06     10     R1       0 01053     F 00000     T 91 08
    000     06     10     R2 W     0 01091     F 00000     T 92 01
    000     06     10     R1       0 01098     F 00000     T 92 02
CF  061     06     10     R1       0 01171     F 00000     T 92 55
    000     06     10     R2 E     0 01251     F 00000     T 93 34
    000     06     10     R1       0 01260     F 00000     T 93 35
    000     06     10     R2 E     0 01278     F 00000     T 93 38
    000     06     10     R1       0 01280     F 00000     T 93 39
    000     06     10     R2 E     0 01287     F 00000     T 93 40
    000     06     10     R3 E     0 01312     F 00000     T 94 01
    000     06     10     R2 E     0 01312     F 00000     T 94 04
    000     06     10     R3 E     0 01370     F 00000     T 94 21
    000     06     10     R2 E     0 01392     F 00000     T 94 24
    000     06     10     R3 E     0 01408     F 00000     T 94 26
    000     06     12     R2 W     0 01428     F 00000     T 94 28
    000     06     12     R1       0 01505     F 00000     T 94 35
CF  062     06     12     R1       0 01631     F 00000     T 94 46
TA  064     06     12     R1       0 01650     F 00000     T 94 49
```

Secondary

B.K. 12/15/76

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.L CTO:DUMPUM.LDA
.ST 14156

RUN 008  SAMPLE RATE 00.5  YEAR 76  MONTH 12  DAY 14  HOUR 12  MIN 40

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
    000     06     12     R1       O 00127    F 00000    T 00 26
TA  064     06     12     R1       O 00219    F 00000    T 01 10
CP  001     06     12     R1       O 00247    F 00000    T 01 14
    000     06     12     R2 N     O 00323    F 00000    T 01 22
    000     08     12     R3 S     O 00386    F 00000    T 01 27
    000     06     12     R2 N     O 00454    F 00000    T 01 32
    000     08     12     R1       O 00523    F 00000    T 01 38
CP  002     08     12     R1       O 00590    F 00000    T 02 15
    000     08     12     R2 N     O 00714    F 00000    T 02 31
    000     08     12     R1       O 00741    F 00000    T 02 33
    000     08     12     R2 N     O 00753    F 00000    T 02 34
    000     10     12     R3 S     O 00758    F 00000    T 02 35
    000     08     12     R2 N     O 00778    F 00000    T 02 37
    000     10     12     R3 S     O 00797    F 00000    T 02 41
    000     10     12     R2 S     O 00856    F 00000    T 03 32
    000     10     12     R1       O 00873    F 00000    T 03 35
CP  003     10     12     R1       O 00941    F 00000    T 03 43
TA  029     10     12     R1       O 00956    F 00000    T 03 46
    000     10     12     R2 S     O 01045    F 00000    T 03 55
    000     10     12     R2 N     O 01058    F 00000    T 03 56
TA  080     12     12     R3 S     O 01119    F 00000    T 04 01
    000     10     12     R2 N     O 01125    F 00000    T 04 02
    000     12     12     R2 S     O 01178    F 00000    T 04 06
    000     12     12     R1       O 01232    F 00000    T 04 20
TA  019     12     12     R1       O 01274    F 00000    T 04 25
CP  004     12     12     R1       O 01361    F 00000    T 04 36
    000     19     16     R2 S     O 01396    F 00000    T 04 41
    000     12     12     R2 W     O 01407    F 00000    T 04 42
TA  018     12     12     R2 W     O 01416    F 00000    T 04 44
    000     12     10     R3 E     O 01438    F 00000    T 04 48
    000     19     16     R2 S     O 01464    F 00000    T 04 51
    000     17     16     R3 N     O 01474    F 00000    T 04 52
    000     17     16     R2 N     O 01490    F 00000    T 04 53
    000     17     16     R1       O 01526    F 00000    T 04 56
    000     17     16     R2 S     O 01656    F 00000    T 05 23
    000     17     16     R1       O 01656    F 00000    T 05 29
    000     10     10     R3 E     O 01727    F 00000    T 05 45
CP  005     10     10     R3 E     O 01732    F 00000    T 05 45
    000     17     16     R2 S     O 01736    F 00000    T 05 46
    000     16     16     R3 N     O 01796    F 00000    T 05 52
    000     16     16     R2 N     O 01850    F 00000    T 05 56
    000     17     16     R3 S     O 01856    F 00000    T 05 57
    000     16     16     R1       O 01869    F 00000    T 05 58
    000     16     16     R2 N     O 01901    F 00000    T 06 00
    000     15     16     R3 N     O 02028    F 00000    T 06 14
    000     16     16     R2 S     O 02052    F 00000    T 06 37
    000     15     16     R3 N     O 02058    F 00000    T 06 39
TA  044     15     16     R3 N     O 02070    F 00000    T 06 41
    000     15     16     R2 N     O 02084    F 00000    T 06 44
    000     15     16     R1       O 02087    F 00000    T 06 44
CP  006     15     16     R1       O 02092    F 00000    T 06 45
    000     08     12     R2 W     O 02098    F 00000    T 06 46
    000     08     12     R3 W     O 02109    F 00000    T 06 48
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Secondary

B.K. 12/15/76

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.L CTO:DUMPUM.LDA

.ST 14156

RUN 009   SAMPLE RATE 00.5   YEAR 76   MONTH 12   DAY 14   HOUR 14   MIN 20

  FIFTH WHEEL FEET/PULSE   0002    ODOMETER FEET/PULSE   0002
TP   000      06      12      R1       O 00117     F 00000     T 00 38
CP   064      06      12      R1       O 00215     F 00000     T 00 51
CP   001      06      12      R1       O 00237     F 00000     T 00 54
     000      06      12      R2 N     O 00335     F 00000     T 01 02
     000      08      12      R3 S     O 00365     F 00000     T 01 04
     000      06      12      R2 N     O 00388     F 00000     T 01 05
     000      08      12      R2 S     O 00410     F 00000     T 01 07
     000      08      12      R3 S     O 00423     F 00000     T 01 08
     000      06      12      R2 N     O 00445     F 00000     T 01 10
     000      06      12      R3 N     O 00456     F 00000     T 01 11
     000      08      12      R2 S     O 00465     F 00000     T 01 13
     000      08      12      R1       O 00510     F 00000     T 01 40
CP   002      08      12      R1       O 00579     F 00000     T 01 50
     000      08      12      R2 N     O 00702     F 00000     T 02 07
     000      10      12      R3 S     O 00710     F 00000     T 02 08
     000      08      12      R1       O 00718     F 00000     T 02 09
     000      08      12      R2 N     O 00732     F 00000     T 02 10
     000      10      12      R3 S     O 00749     F 00000     T 02 12
     000      08      12      R2 N     O 00762     F 00000     T 02 14
     000      10      12      R3 S     O 00786     F 00000     T 02 23
     000      08      12      R2 N     O 00792     F 00000     T 02 24
     000      10      12      R3 S     O 00795     F 00000     T 02 25
     000      10      12      R2 S     O 00854     F 00000     T 02 34
     000      10      12      R1       O 00865     F 00000     T 02 35
     000      10      12      R2 S     O 00875     F 00000     T 02 36
     000      10      12      R1       O 00886     F 00000     T 02 37
CP   003      10      12      R1       O 00931     F 00000     T 02 41
TA   029      10      12      R1       O 00951     F 00000     T 02 44
     000      10      12      R2 S     O 01042     F 00000     T 02 52
     000      10      12      R2 N     O 01049     F 00000     T 02 52
TA   080      10      12      R2 N     O 01119     F 00000     T 02 57
     000      12      12      R1       O 01227     F 00000     T 03 17
TA   019      12      12      R1       O 01268     F 00000     T 03 22
CP   004      19      16      R2 S     O 01353     F 00000     T 03 32
     000      12      12      R1       O 01358     F 00000     T 03 33
     000      12      12      R2 W     O 01404     F 00000     T 03 38
TA   018      12      12      R2 W     O 01415     F 00000     T 03 40
     000      19      16      R2 S     O 01418     F 00000     T 03 41
     000      12      12      R2 W     O 01430     F 00000     T 03 43
     000      19      16      R2 S     O 01437     F 00000     T 03 44
     000      12      12      R3 W     O 01452     F 00000     T 03 45
     000      17      16      R2 N     O 01495     F 00000     T 03 49
     000      17      16      R3 N     O 01501     F 00000     T 03 49
     000      17      16      R2 N     O 01516     F 00000     T 03 50
     000      17      16      R1       O 01531     F 00000     T 03 51
     000      17      16      R2 N     O 01666     F 00000     T 04 12
     000      16      16      R3 N     O 01666     F 00000     T 04 13
     000      17      16      R2 S     O 01666     F 00000     T 04 13
     000      17      16      R2 N     O 01666     F 00000     T 04 14
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Empirical
Demo.

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.L CT0:DUMPUM.LDA

.ST 14156

RUN 010  SAMPLE RATE 00.5  YEAR 76  MONTH 12  DAY 14  HOUR 17  MIN 05

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
   000     06     12     R1       O 00116    F 00000    T 01 20
TA 064     06     12     R1       O 00193    F 00000    T 02 11
CP 001     06     12     R1       O 00234    F 00000    T 02 16
   000     06     12     R2 N     O 00350    F 00000    T 02 27
   000     06     12     R3 N     O 00370    F 00000    T 02 29
   000     06     12     R2 N     O 00394    F 00000    T 02 34
   000     08     12     R3 S     O 00395    F 00000    T 02 35
   000     06     12     R2 N     O 00396    F 00000    T 02 47
   000     08     12     R3 S     O 00396    F 00000    T 02 49
   000     06     12     R2 N     O 00396    F 00000    T 02 51
   000     08     12     R3 S     O 00396    F 00000    T 02 52
   000     06     12     R2 N     O 00396    F 00000    T 03 06
   000     08     12     R3 S     O 00396    F 00000    T 03 09
   000     06     12     R2 N     O 00396    F 00000    T 03 18
   000     08     12     R3 S     O 00396    F 00000    T 03 18
   000     06     12     R2 N     O 00396    F 00000    T 03 19
   000     08     12     R3 S     O 00396    F 00000    T 03 20
   000     06     12     R2 N     O 00399    F 00000    T 03 22
   000     08     12     R3 S     O 00404    F 00000    T 03 23
   000     08     12     R2 S     O 00404    F 00000    T 03 34
   000     06     12     R2 N     O 00404    F 00000    T 03 34
   000     06     12     R3 N     O 00404    F 00000    T 03 36
   000     06     12     R2 N     O 00404    F 00000    T 03 36
   000     06     12     R3 N     O 00404    F 00000    T 03 37
   000     06     12     R2 N     O 00405    F 00000    T 03 38
   000     06     12     R3 N     O 00411    F 00000    T 03 40
   000     06     12     R2 N     O 00422    F 00000    T 03 44
   000     08     12     R3 S     O 00424    F 00000    T 03 45
   000     08     12     R2 S     O 00437    F 00000    T 04 21
   000     08     12     R1       O 00503    F 00000    T 05 20
CP 002     08     12     R1       O 00566    F 00000    T 06 14
   000     08     12     R2 N     O 00612    F 00000    T 06 24
   000     08     12     R1       O 00623    F 00000    T 06 26
   000     08     12     R2 N     O 00664    F 00000    T 06 40
   000     08     12     R1       O 00667    F 00000    T 06 40
   000     08     12     R2 N     O 00681    F 00000    T 06 43
   000     08     12     R1       O 00697    F 00000    T 06 46
   000     08     12     R2 N     O 00703    F 00000    T 06 47
   000     08     12     R1       O 00705    F 00000    T 06 47
   000     10     12     R3 S     O 00730    F 00000    T 06 52
   000     08     12     R2 N     O 00754    F 00000    T 06 58
   000     10     12     R3 S     O 00770    F 00000    T 07 04
   000     08     12     R2 N     O 00770    F 00000    T 07 45
   000     08     12     R3 N     O 00770    F 00000    T 07 46
   000     10     12     R2 S     O 00814    F 00000    T 08 03
   000     10     12     R3 S     O 00817    F 00000    T 08 03
   000     10     12     R2 S     O 00832    F 00000    T 08 05
   000     10     12     R1       O 00840    F 00000    T 08 06
   000     10     12     R2 S     O 00866    F 00000    T 08 09
   000     10     12     R1       O 00870    F 00000    T 08 10
CP 003     10     12     R1       O 00914    F 00000    T 08 18
TA 029     10     12     R1       O 00929    F 00000    T 08 20
```

3.2 RANDOM ROUTE DATA PROCESSING RESULTS

3.2.1 Location Subsystem (Checkpoint) Results

This subsection contains the results obtained by processing random route test data for Runs 1-10 through use of the CPMAIN program. A complete listing of the CPMAIN output for Run 4 is included. The error frequency density and cumulative error statistics for each of the other nine runs are also included.

Two data sheets are shown for Run 10. The first includes only 42 checkpoints. This run was processed by the computer. Note the occurrence of an error in the 1350-1375 foot range. This error is not a valid checkpoint, for it was processed at Checkpoint 44 which was erroneously entered for Turn 44 between Checkpoints 5 and 6 as noted in Table 5-13 of Volume I of this report and in Table 3.3-1 of this Appendix. The second data sheet for Run 10 includes the results of manually computing the errors at Checkpoints 42 through 62 for Run 10 which could not be processed as a result of tape read errors.

RANDOM ROUTE RUN 4 CPMAIN OUTPUT

```
                         TABULAR LISTING

CP    X(CP)   Y(CP)   LOCATION REGION    X(SP)   Y(SP)      ERROR
  1   8180    5705      6,12   R1        8176    5673          32
  2   7635    6136     17,15   R1        7856    6180         145
  3   7521    5782      6, 5   R3E       6865    5846         460
  4   6852    5846     13,10   R2N       6865    5846          13
  5   6455    6268     15,14   R1        6321    6307         139
  6   6009    6222     15,13   R1        6026    6358         137
  7   5585    6389      8, 6   R3S       5585    6389           0
  8   5705    7100     16,11   R1        5553    7099         152
  9   6369    7383     10, 7   R1        6379    7344          40
 10   7500    7204     10,10   R1        7500    7204           0
 11   8211    7127     10,12   R2W       8069    7104         143
 12   8298    7738     12,12   R1        8321    7721          28
 13   7515    7919     12,10   R1        7591    7859          96
 14   6741    8159     12, 8   R3N       6739    8205          46
 15   7147    8153     19,15   R1        7147    8153           0
 16   7969    7159     10,10   R3E       7969    7159           0
 17   7891    6661     16,16   R1        7910    6813         153
 18   6956    6572     15,15   R2N       6956    6572           0
 19   6580    6988     16,14   R1        6427    7006         154
 20   6655    7544     10, 8   R2N       6656    7528          16
 21   6714    7933     12, 8   R1        6714    7933           0
 22   7157    8093     19,15   R1        7147    8153          60
 23   6464    8014     12, 7   R1        6523    7974          71
 24   5867    8275     12, 6   R1        5837    8045         231
 25   6296    8232     19,13   R1        6300    8282          50
 26   6239    7764     17,13   R1        6219    7561         203
 27   6156    7203     16,13   R3N       6170    7301          98
 28   6075    6713      8, 7   R1        6298    6690         224
 29   5684    6934      8, 6   R1        5644    6735         202
 30   5809    7838     12, 6   R1        5837    8045         208
 31   6456    7919     12, 7   R1        6523    7974          86
 32   7090    7702     17,15   R1        7090    7458         244
 33   6996    6930     16,15   R1.       6996    6930           0
 34   6920    6239     15,15   R1        6909    6376         137
 35   6316    6285     15,14   R1        6321    6307          22
 36   5756    6411     15,11   R3E       5585   .6389         172
 37   5705    7100     16,11   R1        5553    7099         152
 38   5809    7838     12, 6   R2S       5801    7837           8
 39   6710    7886     12, 8   R1        6714    7933          47

CT1:RUN004.001

 40   7589    7840     12,10   R1        7591    7859          19
 41   7969    7159     10,10   R3E       7969    7159           0
 42   7444    6878      8,10   R3N       7444    6878           0
 43   6958    6590     15,15   R3N       6956    6572          18
 44   6580    6988     16,14   R1        6427    7006         154
 45   6102    6886     16,17   R1        6122    7042         157
```

RANDOM ROUTE RUN 4 CPMAIN OUTPUT

```
46   5996   6139      15,13   R1       6026   6358         221
47   5553   6009       5, 6   R1       5553   6009           0
48   5585   6389       8, 6   R3S      5585   6389           0
49   5705   7100      16,11   R1       5553   7099         152
50   5809   7838      12, 6   R1       5837   8045         208
51   6239   7764      17,13   R1       6219   7561         203
52   6507   7341      10, 7   R3E      6503   7335           7
53   7055   7276      16,15   R3N      7045   7181          95
54   7715   7176      10,10   R2E      7785   7154          73
55   7891   6661      16,16   R1       7910   6813         153
56   7837   6109      15,16   R2S      7814   5989         122
57   7561   5756       6,10   R1       7321   5782         241
58   6865   5846      13,15   R1       6842   5691         156
59   5988   5938       6, 8   R2W      6135   5934         147
60   5988   5938       6, 8   R3W      5988   5938           0
61   6865   5846      13,15   R1       6842   5691         156
62   7561   5756       6,10   R1       7321   5782         241
63   8176   5673       6,12   R1       8176   5673           0



EVENT    MIN SEC


 58         0:47         VALID




    ERROR FREQUENCY DENSITY                      CUMULATIVE ERRORS
 ERROR             NUMBER    PERCENT         ERROR    # ERRORS   PERC
INTERVAL           POINTS   OF POINTS         FEET    LT FEET     ERR


  0-      25         20         31.75%           0        13       20.63%
 25-      50          5          7.94%          25        20       31.75%
 50-      75          4          6.35%          50        26       41.27%
 75-     100          4          6.35%          75        29       46.03%
100-     125          1          1.59%         100        33       52.38%
125-     150          6          9.52%         125        34       53.97%
150-     175         11         17.46%         150        40       63.49%
200-     225          7         11.11%         175        51       80.95%
225-     250          4          6.35%         225        58       92.06%
450-     475          1          1.59%         250        62       98.41%
                                               475        63      100.00
```

RANDOM ROUTE RUN 4 CPMAIN OUTPUT

```
SORTED ERROR VALUES
   ERROR       CP #


        0          7           153       17
        0         10           153       55
        0         15           154       19
        0         16           154       44
        0         18           156       58
        0         21           156       61
        0         33           157       45
        0         41           172       36
        0         42           202       29
        0         47           203       26
        0         48           203       51
        0         60           208       30
        0         63           208       50
        7         52           221       46
        8         38           224       28
       13          4           231       24
       16         20           241       57
       18         43           241       62
       19         40           244       32
       22         35           460        3
       28         12
       32          1
       40          9
       46         14
       47         39     AVERAGE ERROR        =    103.05
       50         25     STANDARD DEVIATION =      92.83
       60         22     ELAPSED TIME         =  86:17
       71         23     ELAPSED DISTANCE     =      0.00   (FIFTH WHEEL)
       73         54     ELAPSED DISTANCE     = 29758.00   (ODOMETER)
       86         31
       95         53
       96         13
       98         27
      122         56
      137          6
      137         34
      139          5
      143         11
      145          2
      147         59
      152          8
      152         37
      152         49
```

RANDOM ROUTE ERROR STATISTICS, RUN 1

```
    ERROR FREQUENCY DENSITY
  ERROR          NUMBER   PERCENT
 INTERVAL        POINTS  OF POINTS


   0-    25        21       33.87%
  25-    50         7       11.29%
  50-    75         3        4.84%
  75-   100         3        4.84%
 100-   125         1        1.61%
 125-   150         6        9.68%
 150-   175        11       17.74%
 175-   200         1        1.61%
 200-   225         6        9.68%
 225-   250         2        3.23%
 450-   475         1        1.61%
```

```
     CUMULATIVE ERRORS
ERROR    # ERRORS  PERCENT
 FEET    LT FEET    ERRORS


    0       13      20.97%
   25       21      33.87%
   50       29      46.77%
   75       31      50.00%
  100       34      54.84%
  125       35      56.45%
  150       41      66.13%
  175       52      83.87%
  200       53      85.48%
  225       59      95.16%
  250       61      98.39%
  475       62     100.00%
```

RANDOM ROUTE ERROR STATISTICS, RUN 2

```
      ERROR FREQUENCY DENSITY
    ERROR           NUMBER    PERCENT
  INTERVAL          POINTS   OF POINTS


      0-    25        22          34.92%
     25-    50         6           9.52%
     50-    75         3           4.76%
     75-   100         3           4.76%
    100-   125         1           1.59%
    125-   150         6           9.52%
    150-   175         9          14.29%
    200-   225         7          11.11%
    225-   250         4           6.35%
    350-   375         1           1.59%
    450-   475         1           1.59%
```

```
       CUMULATIVE ERRORS
ERROR     # ERRORS   PERCENT
 FEET     LT FEET     ERRORS


     0         14       22.22%
    25         22       34.92%
    50         29       46.03%
    75         31       49.21%
   100         34       53.97%
   125         35       55.56%
   150         41       65.08%
   175         50       79.37%
   225         57       90.48%
   250         61       96.83%
   375         62       98.41%
   475         63      100.00%
```

RANDOM ROUTE ERROR STATISTICS, RUN 3

```
     ERROR FREQUENCY DENSITY
   ERROR         NUMBER    PERCENT
 INTERVAL        POINTS   OF POINTS


    0-    25       18         29.03%
   25-    50        7         11.29%
   50-    75        3          4.84%
   75-   100        3          4.84%
  100-   125        1          1.61%
  125-   150        5          8.06%
  150-   175       11         17.74%
  200-   225        8         12.90%
  225-   250        2          3.23%
  250-   275        1          1.61%
  275-   300        1          1.61%
  300-   325        1          1.61%
  450-   475        1          1.61%
```

```
      CUMULATIVE ERRORS
ERROR    # ERRORS  PERCENT
 FEET    LT FEET    ERRORS


    0       12      19.35%
   25       18      29.03%
   50       26      41.94%
   75       28      45.16%
  100       31      50.00%
  125       32      51.61%
  150       37      59.68%
  175       48      77.42%
  225       56      90.32%
  250       58      93.55%
  275       60      96.77%
  325       61      98.39%
  475       62     100.00%
```

RANDOM ROUTE ERROR STATISTICS, RUN 4

```
     ERROR FREQUENCY DENSITY
   ERROR         NUMBER   PERCENT
  INTERVAL       POINTS  OF POINTS


    0-    25       20       31.75%
   25-    50        5        7.94%
   50-    75        4        6.35%
   75-   100        4        6.35%
  100-   125        1        1.59%
  125-   150        6        9.52%
  150-   175       11       17.46%
  200-   225        7       11.11%
  225-   250        4        6.35%
  450-   475        1        1.59%
```

```
     CUMULATIVE ERRORS
ERROR    # ERRORS  PERCENT
 FEET    LT FEET    ERRORS


    0       13      20.63%
   25       20      31.75%
   50       26      41.27%
   75       29      46.03%
  100       33      52.38%
  125       34      53.97%
  150       40      63.49%
  175       51      80.95%
  225       58      92.06%
  250       62      98.41%
  475       63     100.00%
```

RANDOM ROUTE ERROR STATISTICS, RUN 5

```
      ERROR FREQUENCY DENSITY
    ERROR          NUMBER    PERCENT
  INTERVAL        POINTS   OF POINTS


     0-    25       21       32.81%
    25-    50        4        6.25%
    50-    75        3        4.69%
    75-   100        1        1.56%
   100-   125        2        3.12%
   125-   150        7       10.94%
   150-   175        8       12.50%
   175-   200        2        3.12%
   200-   225        6        9.37%
   225-   250        4        6.25%
   275-   300        1        1.56%
   350-   375        2        3.12%
   425-   450        1        1.56%
   450-   475        1        1.56%
   550-   575        1        1.56%
```

```
      CUMULATIVE ERRORS
ERROR    # ERRORS   PERCENT
 FEET    LT FEET     ERRORS


    0        15      23.44%
   25        21      32.81%
   50        26      40.62%
   75        28      43.75%
  100        29      45.31%
  125        31      48.44%
  150        38      59.37%
  175        46      71.87%
  200        48      75.00%
  225        54      84.37%
  250        58      90.62%
  275        59      92.19%
  375        61      95.31%
  450        62      96.87%
  475        63      98.44%
  575        64     100.00%
```

RANDOM ROUTE ERROR STATISTICS, RUN 6

```
   ERROR FREQUENCY DENSITY
  ERROR           NUMBER    PERCENT
 INTERVAL         POINTS   OF POINTS


   0-     25        26        41.94%
  25-     50         8        12.90%
  50-     75         5         8.06%
  75-    100         8        12.90%
 100-    125         3         4.84%
 125-    150         1         1.61%
 150-    175         3         4.84%
 175-    200         5         8.06%
 225-    250         1         1.61%
 275-    300         1         1.61%
 400-    425         1         1.61%
```

```
      CUMULATIVE ERRORS
ERROR    # ERRORS   PERCENT
 FEET    LT FEET     ERRORS


    0        22       35.48%
   25        27       43.55%
   50        35       56.45%
   75        39       62.90%
  100        47       75.81%
  125        50       80.65%
  150        51       82.26%
  175        54       87.10%
  200        59       95.16%
  250        60       96.77%
  300        61       98.39%
  425        62      100.00%
```

RANDOM ROUTE ERROR STATISTICS, RUN 7

```
   ERROR FREQUENCY DENSITY
 ERROR       NUMBER   PERCENT
INTERVAL     POINTS  OF POINTS


  0-   25      26      41.94%
 25-   50       4       6.45%
 50-   75       7      11.29%
 75-  100      11      17.74%
100-  125       2       3.23%
150-  175       4       6.45%
175-  200       5       8.06%
225-  250       1       1.61%
250-  275       1       1.61%
275-  300       1       1.61%
```

```
     CUMULATIVE ERRORS
ERROR   # ERRORS  PERCENT
 FEET   LT FEET    ERRORS


    0       22      35.48%
   25       27      43.55%
   50       31      50.00%
   75       37      59.68%
  100       48      77.42%
  125       50      80.65%
  175       54      87.10%
  200       59      95.16%
  250       60      96.77%
  275       61      98.39%
  300       62     100.00%
```

RANDOM ROUTE ERROR STATISTICS, RUN 8

```
     ERROR FREQUENCY DENSITY
   ERROR          NUMBER    PERCENT
  INTERVAL        POINTS   OF POINTS


    0-    25        25        40.98%
   25-    50         7        11.48%
   50-    75         7        11.48%
   75-   100         8        13.11%
  100-   125         1         1.64%
  150-   175         3         4.92%
  175-   200         4         6.56%
  225-   250         3         4.92%
  250-   275         1         1.64%
  300-   325         1         1.64%
  400-   425         1         1.64%
```

```
      CUMULATIVE ERRORS
ERROR    # ERRORS   PERCENT
 FEET    LT FEET     ERRORS


    0        21      34.43%
   25        26      42.62%
   50        33      54.10%
   75        39      63.93%
  100        47      77.05%
  125        48      78.69%
  175        51      83.61%
  200        55      90.16%
  225        56      91.80%
  250        59      96.72%
  325        60      98.36%
  425        61     100.00%
```

RANDOM ROUTE ERROR STATISTICS, RUN 9

```
       ERROR FREQUENCY DENSITY
     ERROR            NUMBER    PERCENT
    INTERVAL          POINTS   OF POINTS


       0-    25          26         41.27%
      25-    50           5          7.94%
      50-    75           7         11.11%
      75-   100           9         14.29%
     100-   125           2          3.17%
     125-   150           2          3.17%
     150-   175           3          4.76%
     175-   200           6          9.52%
     225-   250           1          1.59%
     250-   275           1          1.59%
    9950-  9975           1          1.59%
```

```
       CUMULATIVE ERRORS
 ERROR     # ERRORS   PERCENT
  FEET     LT FEET     ERRORS


     0        20        31.75%
    25        26        41.27%
    50        32        50.79%
    75        38        60.32%
   100        47        74.60%
   125        49        77.78%
   150        51        80.95%
   175        54        85.71%
   200        60        95.24%
   250        61        96.83%
   275        62        98.41%
  9975        63       100.00%
```

RANDOM ROUTE ERROR STATISTICS, RUN 10

```
      ERROR FREQUENCY DENSITY
    ERROR           NUMBER    PERCENT
   INTERVAL         POINTS  OF POINTS


     0-    25         12       28.57%
    25-    50          5       11.90%
    50-    75          3        7.14%
    75-   100          6       14.29%
   100-   125          1        2.38%
   125-   150          2        4.76%
   150-   175          4        9.52%
   175-   200          2        4.76%
   225-   250          2        4.76%
   250-   275          1        2.38%
   275-   300          1        2.38%
   350-   375          1        2.38%
   375-   400          1        2.38%
  1350-  1375          1        2.38%
```

```
     CUMULATIVE ERRORS
ERROR    # ERRORS  PERCENT
 FEET    LT FEET    ERRORS


    0         9     21.43%
   25        13     30.95%
   50        17     40.48%
   75        20     47.62%
  100        26     61.90%
  125        27     64.29%
  150        29     69.05%
  175        33     78.57%
  200        35     83.33%
  225        36     85.71%
  250        38     90.48%
  300        39     92.86%
  375        40     95.24%
  400        41     97.62%
 1375        42    100.00%
```

3.2.2 AVM System (Pseudo Checkpoint) Results

This subsection contains results obtained by processing random route Runs 1-10 through use of the RRSL program. Complete results are presented for Random Route Run4 . The tabular output error frequency density and cumulative error statistics for each of the other nine runs are presented. Following the RRSL results obtained by processing Run 10 are the results of computing the location errors at pseudo checkpoints which could not be processed by RRSL. This data is followed by the tabulated error statistics for the case of 0 and 5 percent communication errors.

RANDOM ROUTE AVM SYSTEM RUN 1

```
    NO COMMUNICATION ERRORS                     5% COMMUNICATION ERRORS
       ERROR FREQUENCY DENSITY                   ERROR FREQUENCY DENSITY
     ERROR          NUMBER    PERCENT        ERROR         NUMBER    PERCENT
    INTERVAL        POINTS   OF POINTS      INTERVAL       POINTS   OF POINTS


      0-    25        31       11.52%         0-    25       31       11.52%
     25-    50        39       14.50%        25-    50       39       14.50%
     50-    75        39       14.50%        50-    75       38       14.13%
     75-   100        36       13.38%        75-   100       36       13.38%
    100-   125        24        8.92%       100-   125       23        8.55%
    125-   150        12        4.46%       125-   150       12        4.46%
    150-   175        23        8.55%       150-   175       23        8.55%
    175-   200        14        5.20%       175-   200       16        5.95%
    200-   225        24        8.92%       200-   225       24        8.92%
    225-   250        12        4.46%       225-   250       12        4.46%
    250-   275         7        2.60%       250-   275        7        2.60%
    300-   325         1        0.37%       300-   325        1        0.37%
    325-   350         2        0.74%       325-   350        2        0.74%
    350-   375         1        0.37%       350-   375        1        0.37%
    425-   450         1        0.37%       425-   450        1        0.37%
    450-   475         1        0.37%       450-   475        1        0.37%
    550-   575         1        0.37%       550-   575        1        0.37%
    600-   625         1        0.37%       600-   625        1        0.37%
    CUMULATIVE ERRORS                       CUMULATIVE ERRORS
 ERROR    # ERRORS   PERCENT             ERROR    # ERRORS   PERCENT
 FEET    LT FEET     ERRORS              FEET    LT FEET     ERRORS


     0         2       0.74%                0         2        0.74%
    25        32      11.90%               25        32       11.90%
    50        70      26.02%               50        70       26.02%
    75       111      41.26%               75       110       40.89%
   100       147      54.65%              100       146       54.28%
   125       171      63.57%              125       169       62.83%
   150       181      67.29%              150       179       66.54%
   175       205      76.21%              175       203       75.46%
   200       219      81.41%              200       219       81.41%
   225       242      89.96%              225       242       89.96%
   250       254      94.42%              250       254       94.42%
   275       261      97.03%              275       261       97.03%
   325       262      97.40%              325       262       97.40%
   350       264      98.14%              350       264       98.14%
   375       265      98.51%              375       265       98.51%
   450       266      98.88%              450       266       98.88%
   475       267      99.26%              475       267       99.26%
 ~~575       268      99.63%~~            575       268       99.63%
   625       269     100.00%              625       269      100.00%
AVERAGE ERROR =      115.44          AVERAGE ERROR =       116.19
STANDARD DEVIATION =        91.16STANDARD DEVIATION =        91.29
ELAPSED TIME =     5400              ELAPSED TIME =      5400
```

RANDOM ROUTE AVM SYSTEM RUN 2

NO COMMUNICATION ERRORS

```
   ERROR FREQUENCY DENSITY
 ERROR            NUMBER    PERCENT
INTERVAL          POINTS   OF POINTS


   0-    25         47       20.52%
  25-    50         36       15.72%
  50-    75         30       13.10%
  75-   100         18        7.86%
 100-   125         18        7.86%
 125-   150         14        6.11%
 150-   175         16        6.99%
 175-   200         15        6.55%
 200-   225          4        1.75%
 225-   250          5        2.18%
 250-   275          6        2.62%
 275-   300          6        2.62%
 300-   325          5        2.18%
 325-   350          2        0.87%
 350-   375          3        1.31%
 400-   425          1        0.44%
 425-   450          1        0.44%
 450-   475          1        0.44%
 475-   500          1        0.44%
CUMULATIVE ERRORS
ERROR    # ERRORS   PERCENT
FEET     LT FEET    ERRORS

  0         2        0.87%
 25        49       21.40%
 50        84       36.68%
 75       114       49.78%
100       131       57.21%
125       150       65.50%
150       164       71.62%
175       179       78.17%
200       194       84.72%
225       200       87.34%
250       203       88.65%
275       210       91.70%
300       215       93.89%
325       220       96.07%
350       222       96.94%
375       225       98.25%
425       226       98.69%
450       227       99.13%
475       228       99.56%
500       229      100.00%
AVERAGE ERROR =        110.45
STANDARD DEVIATION =           99.21
ELAPSED TIME =     4819
```

5% COMMUNICATION ERRORS

```
   ERROR FREQUENCY DENSITY
 ERROR            NUMBER    PERCENT
INTERVAL          POINTS   OF POINTS


   0-    25         48       20.96%
  25-    50         36       15.72%
  50-    75         30       13.10%
  75-   100         18        7.86%
 100-   125         18        7.86%
 125-   150         14        6.11%
 150-   175         16        6.99%
 175-   200         15        6.55%
 200-   225          4        1.75%
 225-   250          4        1.75%
 250-   275          6        2.62%
 275-   300          6        2.62%
 300-   325          5        2.18%
 325-   350          2        0.87%
 350-   375          3        1.31%
 400-   425          1        0.44%
 425-   450          1        0.44%
 450-   475          1        0.44%
 475-   500          1        0.44%
CUMULATIVE ERRORS
ERROR    # ERRORS   PERCENT
FEET     LT FEET    ERRORS

  0         2        0.87%
 25        50       21.83%
 50        85       37.12%
 75       115       50.22%
100       132       57.64%
125       151       65.94%
150       165       72.05%
175       180       78.60%
200       195       85.15%
225       200       87.34%
250       203       88.65%
275       210       91.70%
300       215       93.89%
325       220       96.07%
350       222       96.94%
375       225       98.25%
425       226       98.69%
450       227       99. 3%
475       228       99.56%
500       229      100.00%
AVERAGE ERROR =        109.47
STANDARD DEVIATION =           99.18
ELAPSED TIME =     4819
```

RANDOM ROUTE AVM SYSTEM RUN 3

NO COMMUNICATION ERRORS **5% COMMUNICATION ERRORS**

```
      ERROR FREQUENCY DENSITY               ERROR FREQUENCY DENSITY
   ERROR           NUMBER    PERCENT    ERROR           NUMBER   PERCENT
  INTERVAL         POINTS   OF POINTS  INTERVAL         POINTS  OF POINTS


    0-    25         31      15.50%     0-    25          31      15.50%
   25-    50         32      16.00%    25-    50          32      16.00%
   50-    75         26      13.00%    50-    75          27      13.50%
   75-   100         15       7.50%    75-   100          15       7.50%
  100-   125         21      10.50%   100-   125          21      10.50%
  125-   150         13       6.50%   125-   150          13       6.50%
  150-   175         18       9.00%   150-   175          18       9.00%
  175-   200         10       5.00%   175-   200          10       5.00%
  200-   225         11       5.50%   200-   225          11       5.50%
  225-   250          8       4.00%   225-   250           8       4.00%
  250-   275          4       2.00%   250-   275           4       2.00%
  275-   300          3       1.50%   275-   300           3       1.50%
  300-   325          1       0.50%   300-   325           1       0.50%
  325-   350          2       1.00%   325-   350           1       0.50%
  350-   375          2       1.00%   350-   375           2       1.00%
  375-   400          1       0.50%   375-   400           1       0.50%
  400-   425          1       0.50%   400-   425           1       0.50%
  550-   575          1       0.50%   550-   575           1       0.50%
  CUMULATIVE ERRORS                   CUMULATIVE ERRORS
ERROR     # ERRORS    PERCENT       ERROR     # ERRORS    PERCENT
FEET     LT FEET      ERRORS        FEET     LT FEET      ERRORS


    0         3        1.50%           0         3        1.50%
   25        31       15.50%          25        31       15.50%
   50        63       31.50%          50        63       31.50%
   75        89       44.50%          75        90       45.00%
  100       104       52.00%         100       105       52.50%
  125       125       62.50%         125       126       63.00%
  150       139       69.50%         150       140       70.00%
  175       157       78.50%         175       158       79.00%
  200       166       83.00%         200       167       83.50%
  225       177       88.50%         225       178       89.00%
  250       186       93.00%         250       187       93.50%
  275       189       94.50%         275       190       95.00%
  300       192       96.00%         300       193       96.50%
  325       193       96.50%         325       194       97.00%
  350       195       97.50%         350       195       97.50%
  375       197       98.50%         375       197       98.50%
  400       198       99.00%         400       198       99.00%
  425       199       99.50%         425       199       99.50%
  575       200      100.00%         575       200      100.00%
AVERAGE ERROR =       113.59        AVERAGE ERROR =       112.29
STANDARD DEVIATION =        92.84 STANDARD DEVIATION =        91.61
ELAPSED TIME =     4111             ELAPSED TIME =     4111
```

RANDOM ROUTE AVM SYSTEM RUN 4

PSEUDO CP #	ERROR	TIME	ODOMETER
1	352	2:12	703
2	51	2:32	836
3	41	2:52	988
4	79	3:12	1122
5	12	3:32	1231
6	57	3:52	1352
7	57	4:12	1352
8	181	4:32	1462
9	73	4:52	1558
10	19	5:12	1611
11	93	5:32	1775
12	3	5:52	1823
13	376	6:12	1954
14	15	6:32	2068
15	21	6:52	2212
16	153	7:12	2296
17	44	7:32	2428
18	91	7:52	2525
19	32	8:12	2610
20	10	8:32	2621
21	31	8:52	2749
22	150	9:12	2904
23	18	9:32	2970
24	120	9:52	3104
25	241	10:12	3252
26	384	10:32	3366
27	85	10:52	3533
28	67	11:12	3543
29	66	11:32	3712
30	195	11:52	3902
31	129	12:12	4085
32	46	12:32	181
33	150	12:52	330
34	6	13:12	394
35	38	13:32	576
36	420	13:52	726
37	16	14:12	924
38	22	14:32	1048
39	32	14:52	1073
40	74	15:12	1261
41	69	15:32	1264
42	52	15:52	1275
43	341	16:12	1464
44	138	16:32	1671
45	76	16:52	1813
46	25	17:12	1931
47	66	17:32	2091
48	53	17:52	2151
49	221	18:12	2235
50	153	18:32	2334
51	137	18:52	2342
52	137	19:12	2342
53	138	19:32	2479
54	244	19:52	2696
55	171	20:12	2792
56	258	20:32	2955
57	217	20:52	3110
58	181	21:12	3199
59	59	21:32	3373
60	10	21:52	3554
61	243	22:12	3721
62	13	22:32	3836

RANDOM ROUTE AVM SYSTEM RUN 4 (CONT'D)

			ODOMETER
62	13	22:32	3836
63	326	22:52	3966
64	194	23:12	26
65	34	23:32	88
66	13	23:52	112
67	4	24:12	270
68	86	24:32	381
69	121	24:52	485
70	66	25:12	608
71	41	25:32	776
72	68	25:52	879
73	201	26:12	946
74	201	26:32	946
75	55	26:52	1023
76	70	27:12	1166
77	70	27:32	1166
78	124	27:52	1250
79	296	28:12	1437
80	53	28:32	1622
81	27	28:52	1631
82	209	29:12	1722
83	319	29:32	1853
84	404	29:52	1998
85	165	30:12	2108
86	72	30:32	2133
87	72	30:52	2133
88	255	31:12	2260
89	33	31:32	2415
90	178	31:52	2488
91	85	32:12	2574
92	91	32:32	2719
93	226	32:52	2851
94	162	33:12	2993
95	58	33:32	3045
96	166	33:52	3152
97	155	34:12	3259
98	298	34:32	3371
99	83	34:52	3374
100	124	35:12	3476
101	179	35:32	3641
102	89	35:52	3686
103	182	36:12	3794
104	107	36:32	3930
105	63	36:52	32
106	71	37:12	219
107	65	37:32	340
108	32	37:52	489
109	55	38:12	610
110	0	38:32	773
111	34	38:52	936
112	64	39:12	1083
113	62	39:32	1206
114	172	39:52	1340
115	66	40:12	1394
116	164	40:32	1511
117	43	40:52	1558
118	78	41:12	1665
119	6	41:32	1800
120	92	41:52	1937
121	221	42:12	2094
122	168	42:32	2225
123	52	42:52	2382

RANDOM ROUTE AVM SYSTEM RUN 4 (CONT'D)

			ODOMETER
125	169	43:32	2589
126	82	43:52	2692
127	99	44:12	2877
128	65	44:32	3078
129	58	44:52	3083
130	48	45:12	3117
131	91	45:32	3309
132	179	45:52	3355
133	242	46:19	3451
134	215	46:39	3636
135	265	46:59	3824
136	81	47:19	3885
137	81	47:39	3885
138	150	47:59	4003
139	72	48:19	37
140	209	48:39	151
141	15	48:59	228
142	208	49:19	340
143	28	49:39	463
144	97	50:13	580
145	97	50:47	580
146	97	51:21	580
147	97	51:55	580
148	97	52:29	580
149	97	53: 3	580
150	97	53:37	580
151	97	54:12	580
152	97	54:46	580
153	97	55:20	580
154	97	55:54	580
155	97	56:28	580
156	97	57: 2	580
157	97	57:36	580
158	59	57:56	599
159	29	58:16	614
160	16	58:36	637
161	127	58:56	799
162	63	59:16	831
163	65	59:36	875
164	10	59:56	1017
165	110	60:16	1134
166	10	60:36	1254
167	306	60:56	1383
168	230	61:16	1520
169	179	61:36	1665
170	11	61:56	1781
171	100	62:16	1781
172	133	62:36	1847
173	148	62:56	1986
174	106	63:16	2007
175	106	63:36	2007
176	61	63:56	2046
177	111	64:16	2189
178	28	64:36	2192
179	52	64:56	2234
180	8	65:16	2379
181	8	65:36	2379
182	137	65:56	2452
183	167	66:16	2599
184	29	66:36	2722
185	182	66:56	2824
186	145	67:16	2977
187	123	67:36	2988

RANDOM ROUTE AVM SYSTEM RUN 4 (CONT'D)

			ODOMETER
188	111	67:56	
189	207	68:16	3129
190	297	68:36	3275
191	42	68:56	3403
192	205	69:16	3548
193	21	69:36	3701
194	25	69:56	3761
195	226	70:16	3887
196	287	70:36	3917
197	111	70:56	3976
198	95	71:16	3989
199	163	71:36	50
200	168	71:56	216
201	73	72:16	331
202	51	72:36	448
203	153	72:56	602
204	89	73:16	754
205	59	73:36	916
206	70	73:56	1054
207	60	74:16	1105
208	117	74:36	1250
209	226	74:56	1422
210	157	75:16	1546
211	118	75:36	1714
212	57	75:56	1745
213	259	76:16	1864
214	112	76:36	1976
215	187	76:56	2014
216	68	77:16	2180
217	6	77:36	2211
218	144	78:16	3874
219	43	78:36	4058
220	54	78:56	135
221	54	79:16	135
222	59	79:36	191
223	155	79:56	378
224	105	80:16	556
225	229	80:36	723
226	62	80:56	823
227	62	81:16	823
228	185	81:36	972

SIMULATED ERRORS

EUDO CP #	ERROR	TIME	ODOMETER
1	352	2:12	703
2	51	2:34	851 *
3	41	2:52	988
4	79	3:14	1134
5	12	3:32	1231
6	57	3:52	1352
7	57	4:12	1352
8	181	4:32	1462
9	73	4:52	1558
10	19	5:12	1611
11	93	5:32	1775
12	3	5:52	1823
13	376	6:12	1954
14	15	6:32	2068 *
15	21	6:52	2212
16	67	7:14	2309
17	44	7:32	2428
18	91	7:52	2525

RANDOM ROUTE AVM SYSTEM RUN 4 (CONT'D)

			ODOMETER
19	32	8:12	2610
20	10	8:32	2621
21	31	8:52	2749
22	150	9:12	2904
23	18	9:32	2970
24	120	9:52	3104
25	241	10:14	3268
26	384	10:32	3366
27	85	10:52	3533
28	67	11:12	3543
29	66	11:32	3712
30	195	11:52	3902
31	129	12:12	4085
32	46	12:32	181
33	150	12:52	330
34	6	13:12	394
35	38	13:32	576
36	420	13:52	726
37	16	14:12	924
38	22	14:34	1048
39	32	14:52	1073
40	74	15:12	1261
41	69	15:32	1264
42	52	15:52	1275
43	341	16:12	1464
44	138	16:32	1671
45	76	16:52	1813
46	25	17:12	1931
47	66	17:32	2091
48	53	17:52	2151
49	221	18:12	2235
50	153	18:32	2334
51	137	18:52	2342
52	137	19:12	2342
53	138	19:32	2479
54	244	19:52	2696*
55	171	20:12	2792
56	92	20:34	2975
57	217	20:52	3110
58	181	21:12	3199
59	59	21:32	3373*
60	10	21:52	3554
61	50	22:14	3740
62	13	22:32	3836
63	326	22:52	3966
64	194	23:12	26
65	34	23:32	88
66	13	23:52	112
67	4	24:12	270
68	86	24:32	381
69	121	24:52	485
70	66	25:12	608
71	41	25:32	776
72	68	25:52	879
73	201	26:12	946
74	201	26:32	946
75	55	26:52	1023
76	70	27:12	1166
77	70	27:32	1166
78	124	27:52	1250
79	296	28:12	1437
80	53	28:32	1622
81	27	28:52	1631

RANDOM ROUTE AVM SYSTEM RUN 4 (CONT'D)

			ODOMETER
83	319	29:32	1853
84	404	29:52	1998
85	165	30:12	2108
86	72	30:32	2133
87	72	30:52	2133
88	255	31:12	2260
89	33	31:32	2415
90	178	31:52	2488
91	85	32:12	2574
92	91	32:32	2719
93	226	32:52	2851
94	162	33:12	2993
95	58	33:32	3045
96	166	33:52	3152
97	155	34:12	3259
98	298	34:32	3371
99	83	34:52	3374
100	124	35:12	3476
101	179	35:32	3641
102	89	35:52	3686
103	182	36:12	3794
104	107	36:32	3930
105	63	36:52	32
106	71	37:12	219
107	65	37:32	340
108	32	37:52	489
109	55	38:12	610
110	0	38:32	773
111	34	38:52	936
112	64	39:12	1083
113	62	39:32	1206
114	172	39:52	1340 *
115	66	40:12	1394
116	164	40:34	1525
117	43	40:52	1558
118	78	41:12	1665
119	6	41:32	1800
120	92	41:52	1937
121	221	42:12	2094
122	168	42:32	2225
123	52	42:52	2382
124	67	43:12	2535
125	169	43:32	2589
126	82	43:52	2692
127	99	44:12	2877
128	65	44:32	3078
129	58	44:52	3083
130	48	45:12	3117
131	91	45:32	3309
132	179	45:52	3355
133	242	46:19	3451
134	215	46:39	3636
135	265	46:59	3824
136	81	47:19	3885
137	81	47:39	3885
138	150	47:59	4003
139	72	48:19	37
140	209	48:39	151
141	15	49: 1	234
142	208	49:19	340
143	28	49:39	463
144	97	50:13	580
145	97	50:47	580

RANDOM ROUTE AVM SYSTEM RUN 4 (CONT'D)

			ODOMETER
146	97	51:21	580
147	97	51:55	580
148	97	52:29	580
149	97	53: 3	580
150	97	53:55	580
151	97	54:12	580
152	97	54:46	580
153	97	55:20	580
154	97	55:54	580
155	97	56:28	580
156	97	57: 2	580
157	97	57:36	580
158	59	57:56	599
159	29	58:16	614
160	16	58:36	637
161	127	58:56	799
162	63	59:16	831
163	65	59:36	875
164	10	59:56	1017
165	110	60:16	1134
166	10	60:36	1254
167	306	60:56	1383
168	230	61:16	1520
169	179	61:36	1665 *
170	11	61:56	1781
171	100	62:18	1781
172	133	62:36	1847
173	148	62:56	1986
174	106	63:16	2007
175	106	63:36	2007
176	61	63:56	2046
177	111	64:16	2189
178	28	64:36	2192
179	52	64:56	2234
180	8	65:16	2379
181	8	65:36	2379
182	137	65:56	2452
183	167	66:16	2599
184	29	66:36	2722
185	182	66:56	2824
186	145	67:16	2977
187	123	67:36	2988
188	111	67:56	2994
189	207	68:16	3129
190	297	68:36	3275 *
191	42	68:56	3403
192	172	69:18	3558
193	21	69:36	3701
194	25	69:56	3761
195	226	70:16	3887
196	287	70:36	3917
197	111	70:56	3976
198	95	71:16	3989
199	163	71:36	50
200	168	71:56	216
201	73	72:16	331
202	51	72:36	448
203	153	72:56	602
204	89	73:16	754
205	59	73:36	916
206	70	73:56	1054
207	60	74:16	1105
208	117	74:36	1250

RANDOM ROUTE AVM SYSTEM RUN 4 (CONT'D)

			ODOMETER
208	117	74:36	1250
209	226	74:56	1422
210	157	75:16	1546
211	118	75:36	1714
212	57	75:56	1745
213	259	76:16	1864
214	112	76:36	1976
215	187	76:56	2014
216	68	77:16	2180
217	6	77:36	2211
218	144	78:16	3874
219	43	78:36	4058
220	54	78:58	135
221	54	79:16	135
222	59	79:36	191
223	155	79:56	378
224	105	80:18	577
225	229	80:36	723
226	62	80:56	823
227	62	81:16	823
228	185	81:36	972

RANDOM ROUTE AVM SYSTEM RUN 4

NO COMMUNICATION ERRORS

```
      ERROR FREQUENCY DENSITY
   ERROR           NUMBER    PERCENT
 INTERVAL          POINTS   OF POINTS


    0-    25         25       10.96%
   25-    50         23       10.09%
   50-    75         52       22.81%
   75-   100         34       14.91%
  100-   125         17        7.46%
  125-   150         11        4.82%
  150-   175         20        8.77%
  175-   200         12        5.26%
  200-   225         10        4.39%
  225-   250          8        3.51%
  250-   275          3        1.32%
  275-   300          4        1.75%
  300-   325          2        0.88%
  325-   350          2        0.88%
  350-   375          1        0.44%
  375-   400          2        0.88%
  400-   425          2        0.88%
      CUMULATIVE ERRORS
ERROR    # ERRORS    PERCENT
FEET     LT FEET     ERRORS


    0         1        0.44%
   25        27       11.84%
   50        49       21.49%
   75       100       43.86%
  100       135       59.21%
  125       151       66.23%
  150       165       72.37%
  175       182       79.82%
  200       194       85.09%
  225       204       89.47%
  250       212       92.98%
  275       215       94.30%
  300       219       96.05%
  325       221       96.93%
  350       223       97.81%
  375       224       98.25%
  400       226       99.12%
  425       228      100.00%
AVERAGE ERROR =        111.65
STANDARD DEVIATION =          84.63
ELAPSED TIME =     4784
```

5% COMMUNICATION ERROR

```
      ERROR FREQUENCY DENSITY
   ERROR           NUMBER    PERCENT
 INTERVAL          POINTS   OF POINTS


    0-    25         25       10.96%
   25-    50         23       10.09%
   50-    75         50       21.93%
   75-   100         33       14.47%
  100-   125         17        7.46%
  125-   150         11        4.82%
  150-   175         20        8.77%
  175-   200         12        5.26%
  200-   225         11        4.82%
  225-   250          9        3.95%
  250-   275          4        1.75%
  275-   300          4        1.75%
  300-   325          2        0.88%
  325-   350          2        0.88%
  350-   375          1        0.44%
  375-   400          2        0.88%
  400-   425          2        0.88%
      CUMULATIVE ERRORS
ERROR    # ERRORS    PERCENT
FEET     LT FEET     ERRORS


    0         1        0.44%
   25        27       11.84%
   50        48       21.05%
   75        98       42.98%
  100       132       57.89%
  125       148       64.91%
  150       162       71.05%
  175       179       78.51%
  200       191       83.77%
  225       202       88.60%
  250       211       92.54%
  275       215       94.30%
  300       219       96.05%
  325       221       96.93%
  350       223       97.81%
  375       224       98.25%
  400       226       99.12%
  425       228      100.00%
AVERAGE ERROR =        113.75
STANDARD DEVIATION =          85.61
ELAPSED TIME =     4784
```

RANDOM ROUTE AVM SYSTEM RUN 5

NO COMMUNICATION ERRORS

```
   ERROR FREQUENCY DENSITY
 ERROR            NUMBER    PERCENT
INTERVAL          POINTS   OF POINTS
  0-    25          30       17.54%
 25-    50          19       11.11%
 50-    75          25       14.62%
 75-   100          14        8.19%
100-   125          14        8.19%
125-   150          10        5.85%
150-   175           9        5.26%
175-   200           9        5.26%
200-   225          10        5.85%
225-   250           3        1.75%
250-   275          10        5.85%
275-   300           1        0.58%
300-   325           3        1.75%
325-   350           4        2.34%
350-   375           1        0.58%
375-   400           4        2.34%
425-   450           2        1.17%
450-   475           1        0.58%
700-   725           2        1.17%
   CUMULATIVE ERRORS
ERROR    # ERRORS   PERCENT
FEET     LT FEET     ERRORS

  0          2        1.17%
 25         31       18.13%
 50         53       30.99%
 75         74       43.27%
100         88       51.46%
125        102       59.65%
150        113       66.08%
175        124       72.51%
200        130       76.02%
225        140       81.87%
250        144       84.21%
275        153       89.47%
300        155       90.64%
325        157       91.81%
350        161       94.15%
375        162       94.74%
400        166       97.08%
450        168       98.25%
475        169       98.83%
725        171      100.00%
AVERAGE ERROR =       131.19
STANDARD DEVIATION =        123.78
ELAPSED TIME =     3445
```

5% COMMUNICATION ERRORS

```
   ERROR FREQUENCY DENSITY
 ERROR            NUMBER    PERCENT
INTERVAL          POINTS   OF POINTS
  0-    25          30       17.54%
 25-    50          20       11.70%
 50-    75          25       14.62%
 75-   100          14        8.19%
100-   125          14        8.19%
125-   150          10        5.85%
150-   175           9        5.26%
175-   200           9        5.26%
200-   225          10        5.85%
225-   250           3        1.75%
250-   275          10        5.85%
275-   300           1        0.58%
300-   325           3        1.75%
325-   350           4        2.34%
375-   400           4        2.34%
425-   450           2        1.17%
450-   475           1        0.58%
700-   725           2        1.17%
CUMULATIVE ERRORS
ERROR    # ERRORS   PERCENT
FEET     LT FEET     ERRORS

  0          2        1.17%
 25         31       18.13%
 50         54       31.58%
 75         75       43.86%
100         89       52.05%
125        103       60.23%
150        114       66.67%
175        125       73.10%
200        131       76.61%
225        141       82.46%
250        145       84.80%
275        154       90.06%
300        156       91.23%
325        158       92.40%
350        162       94.74%
400        166       97.08%
450        168       98.25%
475        169       98.83%
725        171      100.00%
AVERAGE ERROR =       129.31
STANDARD DEVIATION =        122.87
ELAPSED TIME =     3445
```

RANDOM ROUTE AVM SYSTEM RUN 6

NO COMMUNICATION ERRORS **5% COMMUNICATION ERRORS**

```
      ERROR FREQUENCY DENSITY                   ERROR FREQUENCY DENSITY
   ERROR              NUMBER    PERCENT      ERROR              NUMBER    PERCENT
  INTERVAL            POINTS   OF POINTS    INTERVAL            POINTS   OF POINTS


     0-     25          28       13.59%       0-     25           28       13.59%
    25-     50          33       16.02%      25-     50           33       16.02%
    50-     75          29       14.08%      50-     75           29       14.08%
    75-    100          23       11.17%      75-    100           24       11.65%
   100-    125          14        6.80%     100-    125           14        6.80%
   125-    150          27       13.11%     125-    150           26       12.62%
   150-    175          11        5.34%     150-    175           10        4.85%
   175-    200           8        3.88%     175-    200            8        3.88%
   200-    225           5        2.43%     200-    225            5        2.43%
   225-    250           9        4.37%     225-    250            9        4.37%
   250-    275           3        1.46%     250-    275            3        1.46%
   275-    300           6        2.91%     275-    300            6        2.91%
   300-    325           4        1.94%     300-    325            5        2.43%
   350-    375           1        0.49%     350-    375            1        0.49%
   400-    425           3        1.46%     400-    425            3        1.46%
   425-    450           2        0.97%     425-    450            2        0.97%
   CUMULATIVE ERRORS                        CUMULATIVE ERRORS
ERROR     # ERRORS    PERCENT            ERROR     # ERRORS    PERCENT
FEET       LT FEET    ERRORS             FEET       LT FEET    ERRORS


     0          2       0.97%                0          2       0.97%
    25         30      14.56%               25         30      14.56%
    50         62      30.10%               50         62      30.10%
    75         91      44.17%               75         91      44.17%
   100        113      54.85%              100        114      55.34%
   125        127      61.65%              125        128      62.14%
   150        154      74.76%              150        154      74.76%
   175        165      80.10%              175        164      79.61%
   200        173      83.98%              200        172      83.50%
   225        178      86.41%              225        177      85.92%
   250        187      90.78%              250        186      90.29%
   275        190      92.23%              275        189      91.75%
   300        196      95.15%              300        195      94.66%
   325        200      97.09%              325        200      97.09%
   375        201      97.57%              375        201      97.57%
   425        204      99.03%              425        204      99.03%
   450        206     100.00%              450        206     100.00%
AVERAGE ERROR =       113.21            AVERAGE ERROR =       113.67
STANDARD DEVIATION =        93.08STANDARD DEVIATION =          93.93
ELAPSED TIME =     4141                ELAPSED TIME =     4141
```

RANDOM ROUTE AVM SYSTEM RUN 7

NO COMMUNICATION ERRORS　　　　5% COMMUNICATION ERRORS

```
    ERROR FREQUENCY DENSITY            ERROR FREQUENCY DENSITY
  ERROR          NUMBER   PERCENT    ERROR           NUMBER   PERCENT
 INTERVAL        POINTS  OF POINTS  INTERVAL         POINTS  OF POINTS


   0-    25        32      12.31%     0-    25        32       12.31%
  25-    50        32      12.31%    25-    50        33       12.69%
  50-    75        35      13.46%    50-    75        36       13.85%
  75-   100        31      11.92%    75-   100        31       11.92%
 100-   125        35      13.46%   100-   125        35       13.46%
 125-   150        19       7.31%   125-   150        19        7.31%
 150-   175        21       8.08%   150-   175        20        7.69%
 175-   200        15       5.77%   175-   200        14        5.38%
 200-   225         6       2.31%   200-   225         6        2.31%
 225-   250        14       5.38%   225-   250        14        5.38%
 250-   275         5       1.92%   250-   275         5        1.92%
 275-   300         6       2.31%   275-   300         6        2.31%
 300-   325         1       0.38%   300-   325         1        0.38%
 350-   375         1       0.38%   350-   375         1        0.38%
 375-   400         3       1.15%   375-   400         3        1.15%
 400-   425         3       1.15%   400-   425         3        1.15%
 475-   500         1       0.38%   475-   500         1        0.38%
 CUMULATIVE ERRORS                  CUMULATIVE ERRORS
ERROR   # ERRORS   PERCENT          ERROR   # ERRORS   PERCENT
FEET    LT FEET    ERRORS           FEET    LT FEET    ERRORS


  25        33      12.69%            25        33      12.69%
  50        65      25.00%            50        66      25.38%
  75        99      38.08%            75       101      38.85%
 100       130      50.00%           100       132      50.77%
 125       166      63.85%           125       168      64.62%
 150       184      70.77%           150       186      71.54%
 175       205      78.85%           175       206      79.23%
 200       220      84.62%           200       220      84.62%
 225       228      87.69%           225       228      87.69%
 250       243      93.46%           250       243      93.46%
 275       245      94.23%           275       245      94.23%
 300       251      96.54%           300       251      96.54%
 325       252      96.92%           325       252      96.92%
 375       253      97.31%           375       253      97.31%
 400       256      98.46%           400       256      98.46%
 425       259      99.62%           425       259      99.62%
 500       260     100.00%           500       260     100.00%
AVERAGE ERROR =     116.33          AVERAGE ERROR =     115.31
STANDARD DEVIATION =      89.38STANDARD DEVIATION =       89.35
ELAPSED TIME =    5161              ELAPSED TIME =    5161
```

RANDOM ROUTE AVM SYSTEM RUN 8

NO COMMUNICATION ERRORS 5% COMMUNICATION ERRORS

```
   ERROR FREQUENCY DENSITY             ERROR FREQUENCY DENSITY
 ERROR           NUMBER   PERCENT    ERROR           NUMBER   PERCENT
 INTERVAL        POINTS  OF POINTS INTERVAL          POINTS  OF POINTS


   0-    25        27       10.63%   0-    25          27       10.63%
  25-    50        46       18.11%  25-    50          47       18.50%
  50-    75        36       14.17%  50-    75          37       14.57%
  75-   100        26       10.24%  75-   100          27       10.63%
 100-   125        19        7.48% 100-   125          19        7.48%
 125-   150        20        7.87% 125-   150          20        7.87%
 150-   175        23        9.06% 150-   175          23        9.06%
 175-   200        13        5.12% 175-   200          13        5.12%
 200-   225        13        5.12% 200-   225          13        5.12%
 225-   250        11        4.33% 225-   250          11        4.33%
 250-   275         9        3.54% 250-   275           7        2.76%
 275-   300         3        1.18% 275-   300           3        1.18%
 300-   325         1        0.39% 300-   325           1        0.39%
 325-   350         1        0.39% 325-   350           1        0.39%
 375-   400         3        1.18% 375-   400           3        1.18%
 400-   425         1        0.39% 400-   425           1        0.39%
 425-   450         1        0.39% 425-   450           1        0.39%
 475-   500         1        0.39% CUMULATIVE ERRORS
 CUMULATIVE ERRORS                  ERROR    # ERRORS   PERCENT
ERROR    # ERRORS   PERCENT         FEET     LT FEET    ERRORS
FEET     LT FEET    ERRORS


                                       0          3       1.18%
  0          3       1.18%            25         28      11.02%
 25         28      11.02%            50         75      29.53%
 50         74      29.13%            75        111      43.70%
 75        109      42.91%           100        138      54.33%
100        135      53.15%           125        158      62.20%
125        155      61.02%           150        179      70.47%
150        176      69.29%           175        200      78.74%
175        197      77.56%           200        213      83.86%
200        210      82.68%           225        227      89.37%
225        224      88.19%           250        238      93.70%
250        235      92.52%           275        244      96.06%
275        243      95.67%           300        247      97.24%
300        246      96.85%           325        248      97.64%
325        247      97.24%           350        249      98.03%
350        248      97.64%           400        252      99.21%
400        251      98.82%           425        253      99.61%
425        252      99.21%           450        254     100.00%
450        253      99.61%
500        254     100.00%
AVERAGE ERROR =     114.63          AVERAGE ERROR =     111.47
STANDARD DEVIATION =       89.67    STANDARD DEVIATION =       85.82
ELAPSED TIME =     5141             ELAPSED TIME =     5141
```

RANDOM ROUTE AVM SYSTEM RUN 9

NO COMMUNICATION ERRORS   5% COMMUNICATION ERRORS

```
      ERROR FREQUENCY DENSITY          ERROR FREQUENCY DENSITY
     ERROR          NUMBER   PERCENT   ERROR          NUMBER   PERCENT
    INTERVAL        POINTS  OF POINTS INTERVAL        POINTS  OF POINTS


       0-   25        27      11.74%    0-   25         27      11.74%
      25-   50        31      13.48%   25-   50         31      13.48%
      50-   75        35      15.22%   50-   75         35      15.22%
      75-  100        31      13.48%   75-  100         31      13.48%
     100-  125        22       9.57%  100-  125         23      10.00%
     125-  150        23      10.00%  125-  150         23      10.00%
     150-  175        19       8.26%  150-  175         19       8.26%
     175-  200        12       5.22%  175-  200         12       5.22%
     200-  225        13       5.65%  200-  225         12       5.22%
     225-  250         8       3.48%  225-  250          8       3.48%
     250-  275         2       0.87%  250-  275          2       0.87%
     275-  300         1       0.43%  275-  300          1       0.43%
     300-  325         1       0.43%  300-  325          1       0.43%
     325-  350         1       0.43%  325-  350          1       0.43%
     350-  375         2       0.87%  350-  375          2       0.87%
     400-  425         2       0.87%  400-  425          2       0.87%
     CUMULATIVE ERRORS                CUMULATIVE ERRORS
 ERROR    # ERRORS   PERCENT        ERROR    # ERRORS   PERCENT
 FEET     LT FEET    ERRORS         FEET     LT FEET    ERRORS


     0         1       0.43%            0         1       0.43%
    25        28      12.17%           25        28      12.17%
    50        59      25.65%           50        59      25.65%
    75        93      40.43%           75        93      40.43%
   100       124      53.91%          100       124      53.91%
   125       149      64.78%          125       150      65.22%
   150       169      73.48%          150       170      73.91%
   175       189      82.17%          175       190      82.61%
   200       201      87.39%          200       202      87.83%
   225       214      93.04%          225       214      93.04%
   250       221      96.09%          250       221      96.09%
   275       223      96.96%          275       223      96.96%
   300       224      97.39%          300       224      97.39%
   325       226      98.26%          325       226      98.26%
   375       228      99.13%          375       228      99.13%
   425       230     100.00%          425       230     100.00%
AVERAGE ERROR =       108.83      AVERAGE ERROR =       108.45
STANDARD DEVIATION =        76.97 STANDARD DEVIATION =        76.68
ELAPSED TIME =     4601           ELAPSED TIME =     4601
```

RANDOM ROUTE AVM SYSTEM RUN 10

```
    NO COMMUNICATION ERRORS                5% COMMUNICATION ERRORS

      ERROR FREQUENCY DENSITY                 ERROR FREQUENCY DENSITY
     ERROR           NUMBER    PERCENT     ERROR          NUMBER    PERCENT
    INTERVAL         POINTS   OF POINTS   INTERVAL        POINTS   OF POINTS


      0-    25         15         9.80%     0-    25        13         8.50%
     25-    50         21        13.73%    25-    50        21        13.73%
     50-    75         30        19.61%    50-    75        30        19.61%
     75-   100         21        13.73%    75-   100        22        14.38%
    100-   125         13         8.50%   100-   125        13         8.50%
    125-   150         17        11.11%   125-   150        17        11.11%
    150-   175         11         7.19%   150-   175        11         7.19%
    175-   200          6         3.92%   175-   200         7         4.58%
    200-   225          6         3.92%   200-   225         6         3.92%
    225-   250          5         3.27%   225-   250         5         3.27%
    250-   275          1         0.65%   250-   275         1         0.65%
    275-   300          3         1.96%   275-   300         3         1.96%
    325-   350          1         0.65%   325-   350         1         0.65%
    375-   400          1         0.65%   375-   400         1         0.65%
    425-   450          1         0.65%   425-   450         1         0.65%
    775-   800          1         0.65%   775-   800         1         0.65%
    CUMULATIVE ERRORS                     CUMULATIVE ERRORS
ERROR     # ERRORS    PERCENT         ERROR     # ERRORS    PERCENT
FEET     LT FEET      ERRORS          FEET     LT FEET      ERRORS


   25          17      11.11%            25        15         9.80%
   50          42      27.45%            50        40        26.14%
   75          67      43.79%            75        65        42.48%
  100          87      56.86%           100        86        56.21%
  125         102      66.67%           125       101        66.01%
  150         118      77.12%           150       117        76.47%
  175         129      84.31%           175       128        83.66%
  200         134      87.58%           200       134        87.58%
  225         140      91.50%           225       140        91.50%
  250         145      94.77%           250       145        94.77%
  275         146      95.42%           275       146        95.42%
  300         149      97.39%           300       149        97.39%
  350         150      98.04%           350       150        98.04%
  400         151      98.69%           400       151        98.69%
  450         152      99.35%           450       152        99.35%
  800         153     100.00%           800       153       100.00%
AVERAGE ERROR =       109.42        AVERAGE ERROR =        111.07
STANDARD DEVIATION =          94.81STANDARD DEVIATION =           94.46
ELAPSED TIME =      3063            ELAPSED TIME =     3063
```

MANUALLY PROCESSED RANDOM ROUTE AVM SYSTEM ERRORS, RUN 10

PCP	ERROR	TIME	ODOM	
154	0	53:34	1032	
5	267	53:54	1538	
6	293	54:14	1618	
7	562	54:34	1626	
8	341	54:54	1700	
9	22	55:14	2150	
160	73	55:34	2590	
1	253	55:54	3006	
2	269	56:14	3588	
3	117	56:34	4222	
4	309	56:54	4578	
5	385	57:14	4984	
6	30	57:34	5248	
7	178	57:54	5336	
8	36	58:14	5426	
9	118	58:34	5958	PCP'=158'
170	182	58:54	6022	
1	171	59:14	6266	
2	30	59:34	6646	
3	126	59:54	6838	
4	67	60:14	7240	
5	52	60:34	7260	
6	58	60:54	7620	
7	229	61:14	7888	
8	228	61:34	7964	
9	80	61:54	8454	
180	92	62:14	8988	
1	89	62:34	9370	
2	62	62:54	9578	
3	123	63:14	9646	
4	269	63:34	10050	
5	82	63:54	10274	
6	35	64:14	10596	
7	56	64:34	10824	
8	291	64:54	11140	
9	20	65:14	11470	
190	109	65:34	11920	PCP'=109'
1	99	65:54	11930	
2	15	66:14	12030	
3	208	66:34	12506	

MANUALLY PROCESSED RANDOM ROUTE AVM SYSTEM ERRORS, RUN 10 (CONT'D)

PCP	ERROR	TIME	ODOM
194	38	66:54	12744
5	222	67:14	12946
6	169	67:34	13356
7	566	67:54	13754
8	48	68:14	14038
9	48	68:34	14038
200	297	73:14	17368
1	93	73:34	17638
2	91	73:54	17982
3	35	74:14	18038
4	88	74:34	18166
5	86	74:54	18464
6	62	75:14	18918
7	39	75:34	19408
8	53	75:54	19794
9	8	76:14	19856
210	21	76:14	19868

RANDOM ROUTE RUN 10 AVM SYSTEM ERRORS

No Communication Errors

Error Frequency Density	No. Samples
0- 25	21
25- 50	30
50- 75	38
75-100	30
100-125	17
125-150	18
150-175	13
175-200	8
200-225	8
225-250	8
250-275	5
275-300	5
300-325	1
325-350	2
375-400	2
425-450	1
550-575	2
775-800	1

5% Communication Errors

Error Frequency Density	No. Samples
0- 25	21
25- 50	30
50- 75	38
75-100	30
100-125	16
125-150	18
150-175	14
175-200	8
200-225	8
225-250	8
250-275	5
275-300	5
300-325	1
325-350	2
375-400	2
425-450	1
550-575	2
775-800	1

Cumulative Error Distribution

Error	No. Samples LT Error	Percent Samples LT Error
25	21	10.00
50	51	24.29
75	89	42.38
100	119	56.67
125	136	64.76
150	154	73.33
175	167	79.52
200	175	83.33
225	183	87.14
250	191	90.95
275	196	93.33
306	201	95.71
325	202	96.19
350	204	97.14
400	206	98.10
450	207	98.57
575	209	99.52
800	210	100.00

Cumulative Error Distribution

Error	No. Samples LT Error	Percent Samples LT Error
25	21	10.00
50	51	24.29
75	89	42.38
100	119	56.67
125	135	64.28
150	153	72.86
175	167	79.52
200	175	83.33
225	183	87.14
250	191	90.95
275	196	93.33
300	201	95.71
325	202	96.19
350	204	97.14
400	206	98.10
450	207	98.57
575	209	99.52
800	210	100.00

3.2.3 Random Route One-Tenth Mile Averages

This subsection contains the results obtained by processing Random Route Runs 1-10 through use of the RRTEN program. The format is as follows:

Street Segment No:

1 2 3 4 5 6 7 8 9 10

11 12 13 14 ....

Average Errors Over One-Tenth Mile Segments of Random Route Runs 1, 2 and 3

```
RUN   1    RANDOM ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  59   179   113   102   122   214   106   227   184    56
  73   114    96    84   188    51   115   226    78   105
 258   100   151   205   367    84   142   152   171    75
* 79    47   154   136   110   158    90   114   161   103
 CT1:RUN001.001

 122    93   188   173    93   116   117   105    75    75
 197   119    57    57   102   128   121    94   113   125
 193   118   131    73   137   137   147   105   119    68
  51   111   111   155   129    74   204    67   124   114
 131    75   122   115    85   121   148   135   174    78
```

```
RUN   2    RANDOM ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


 168    99   127    76   179    90    75    83    98    68
  91    89    51    55   227    43    76   158   106   175
 146   114    89   209   358   105    99   142   139   104
  86    71   127   144    94   140    76    85   143   146
*198   134   179    60    75   117   225   123    71    83
 CT1:RUN002.001

 149    89   122   144   194    70   153   161   142   255
 208   389   145   119    81   110    73   231   172    71
 102    93   132    90   195   142    76   239    67   102
 120    79    99   149   115    69    61    96   223   114
  74
```

```
RUN   3    RANDOM ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


 126    81    57    68    84   102   133    51    72    28
 173   152    78   140    45    85    83   236    80   102
  88   117   165   142   154   113   324   129   207   125
 116    93    70   161    94    71   148   146   146   173
*176    95   129   117   121   181   121   103   151   131
 CT1:RUN003.001

 110   125   107   129   112   200    96   139    52   335
 113   118   110   143   106   104   177   139   116    73
 188    62   115   151   110   152    66    99    98   119
  81    83   107    81    88    71    77    97    89
```

Average Errors Over One-Tenth Mile Segments of Random Route Runs 4, 5 and Composite

```
RUN   4    RANDOM ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


 144   134    95    78   103    80   125    65    75    57
  77   263   120    76   169    85   116   202    64    81
 148    70    87   166   259   105   112   111   119   151
  74    85   114   135    94   160    83   236   190   132
*162   148   129   122    94   100   145    94    87    87
 CT1:RUN004.001

 123    88    80   125   100    93   113    88   158   160
 147   149   110    64   107   139   186   191   116    66
  54   118   113   156   118    62   141    91    72   148
  63    88    95    80   108    44    76   172   149   101
•
```

```
RUN   5    RANDOM ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


 253   149   127   108    75    93   102   295   160    85
  46    89    84    78   208   119   212   142   248   139
 177   153    93   174   437   359   174   185    97   104
 139   106   164   228   103   180   115   125   188   191
 231   177   285   102    97   115   270    91    60   119
*110   117   167   147    83   149   194   214   134    75
 CT1:RUN005.001

  85   151   101    41   153   155   330   406   103    65
 139    69   101   149   145   135    85   148   110   119
 163    88    60    50    39    82   126   117    88
•
```

```
 COMPOSITE PRIMARY RUNS 1-5
 AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


 150   128   104    87   113   116   108   144   118    59
  92   141    85   112   167   107   120   193   115   120
 163   110   117   179   315   153   170   144   147   112
  99    80   126   161    99   142   102   141   166   149
 178   129   182   115    96   126   176   103    89    99
 138   107    86   120   118   128   135   139   139   190
 149   185   119    88   117   129   182   214   125    69
 107   114   114   140   139   113   114   129    94   120
 112    82    97    95    87    77    98   123   145    97    74
```

Average Errors Over One-Tenth Mile Segments of Random Route Runs 6, 7 and 8

```
RUN  6   RANDOM ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  138   68   71  189  140  145   96  182   83  168
  106  128  110   92  139   96   62  247  115  103
   62   59   77   95   97  194  162   94  117  107
   75   98  152   51   63   90  122   89  101   93
 *125  115  181   80  103  119  121  158   85  109
  CT1:RUN006.001

  117   63   99  128   77   49   89   59   77   78
  228  141  266   72   81  117  131  167  100   80
   94   69   75   94   89   86  104  127  141  109
  132   90   97  105   83  158   91   96  125   78
   67
```

```
RUN  7   RANDOM ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   92   71   76  134   82  132  103  136  102  110
  110  115   80  105   84  214   73  199   75  106
  113   74   69   51  103  160  171   45  108   85
 *118   85  154   60   73  109  134  130  133  171
  CT1:RUN007.001

  134   81  185   65  144  114  132  160   98  106
   77  135  135   90  163   59   86  132   68   83
   77  107  165  312   65   98   93  157  101  119
  175   88   72   93   84  171  122  112   57   48
  123  129  236  121  125   56  154   52   95  129
  105   83
```

```
RUN  8   RANDOM ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  117   83   98   72   97  117  159  119   92  136
   63  139   59   93  164   88   58  226   49   82
   76   50  104   93   85  162  176   78   91   81
*  71   68  174   57   49   89  161  117  123   61
  CT1:RUN008.001

  106  126  123   91  113   85  101  161  146   59
   85  147  142  171  121   54  125  150   78  116
   73  205   63  466   75   72   77   94   84  106
   51  133   77   77   94  158   77   94  237  129
  157  102   89   82  218   81  109   42   67  145
   77  124

.
```

Average Errors Over One-Tenth Mile Segments of Random Route Runs 9, 10 and Composite

```
RUN  9   RANDOM ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   67    83    85   116   116   158   124   101    94   122
   65    83    90    99   149    84    73   154   138   104
   77    76    70    80   107   184   165    60   119    86
   55   108   146   108    50   117   110   110   100    92
 *138   104   175   112   129    91   133    90   122    69
  CT1:RUN009,001

  112   108    98   135    77    67   180    85   108   107
  156   119   276    86    91   135   119   156    80   152
  119   131   103    79   109   132    99    97   162   101
  110   142    67   163    96    82    72    94   131    73
   71


RUN 10   RANDOM ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   55    76    49   118   117   122    96   128   100   120
  100    96    89   122   106    45    98   124   122    74
   69    94   151    75    85   184   177    87    91   106
  166    68    89   143    77    66    99   109    82    87
 *119   166    90   133   160   103   141   117   182   176
  CT1:RUN010.001

   95   100   148    84   120   180    57    83   149    98
?ERR 61 ILLEGAL MEMORY REFERENCE
IN   ROUTINE ".MAIN."  LINE 40


COMPOSITE SECONDARY RUNS 6-10
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  94    76    76   126   110   134   115   133    94   131
  89   112    86   102   128   105    73   190   100    94
  79    71    94    79    95   177   170    73   105    93
  97    85   143    84    62    94   125   111   108   101
 124   118   151    96   130   102   126   137   127   104
  97   110   124   122   112    82   107   102    96    96
 134   143   193   234    78   106   105   144    91   114
 110   105    82    86    94   137   101   108   149    97
 131   116   122   118   131    94   107    71   105   106    80   104
```

3.3 RANDOM ROUTE DATA PROCESSING REQUIREMENTS

During the recording of random route data, three manual entry errors occurred which required special consideration during data processing. These errors and the necessary considerations are described in Table 3.3.1. It is also noted that the second cassette on Run 10 could not be processed. As noted in Volume I, Section 5.4, the last 21 checkpoints of this run were processed manually from the dump.

Random Route Data Processing Anomalies

RUN NO.	PROBLEM	SOLUTION
1	TA63 entered twice after CP56	Deleted last TA63 prior to CP57 via card input in RRSL and RRTEN
9	CP64 entered instead of TA64 at beginning of run	Changed occurance of CP63 to TA64 via card input in RPMAIN, RRSL, and RRTEN
10	CP44 entered instead of TA44 after CP5	Changed CP44 to TA44 via card input to CPMAIN, RRSL, and RRTEN
10	CP61 entered instead of TA61 after CP55	Changed CP61 to TA61 via card input in CPMAIN, RRSL, and RRTEN
10	Couldn't process data from second cassette	Manually computed results from dump.

4. FIXED ROUTE

4.1 FIXED ROUTE TESTS

4.1.1 Fixed Route Test Log Sheets

A log sheet describing the test conditions and any anomalies was filled out at the completion of each test run. Copies of each fixed route test log sheet are contained in this subsection.

Start Time 1310
End Time 1450
24°

T E S T D A T A L O G

TEST RUN NO. 11
SHEET NO. 1 OF 1

TYPE OF TEST: Fixed Route
DATE: 13 JAN 1977

BRIEF NARRATIVE DESCRIPTION OF TEST
Ran Hoffman Fixed Route containing 15 time points and 76 checkpoints.

ROUTE IDENTIFICATION: Begin at Rittenhouse Square and end at 13th and Walnut.

EVENT MARKER NUMBER: Time points 1-15 in order
Checkpoints 1-76 in order

TSC checkpoints not loaded in Hoffman software
TP3 - Door Closed
TP4 - Door Closed
TP5 - Door Closed
TP9 Door Closed
TP10 Door Closed
TP11 Door Closed
TP13 Door Closed

EQUIPMENT UTILIZED/TEST CONDITION:
VEHICLE UNIT NO.: 1
VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm
ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2
R1 DROPOUT SWITCH: Off [✓ On]
OTHER:
TEMPERATURE: 24°F
PRECIPITATION: None
ROAD CONDITIONS: Dry
TEST TAPE NO(S). 11-1 & 11-2
FILE NO
SAMPLE RATE: 0.5 SECOND
TEST DIRECTOR George W Gruver
RUN TIME: 100 min.
TSC MONITOR
Elapsed Distance 13mi 38' odom
13mi 84' 5th

Start Time 1500
End Time 1637

TEST DATA LOG

TEST RUN NO. 12

SHEET NO. 1 OF 1

TYPE OF TEST: Fixed Route

DATE: 1-13-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: Hoffman Fixed Route

EVENT MARKER NUMBER: Time Point 1-15 in order
TSC Checkpoint 1-76 in order

Door Closed AT
TP 3
TP 4
TP 5
TP 6
TP 8
TP 10
TP 11
TP 13

Heavy traffic

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 972 FPP 2

R1 DROPOUT SWITCH: Off/ [✓ On]

OTHER:

TEMPERATURE: 25°/24°F PRECIPITATION: No ROAD CONDITIONS: Dry

TEST TAPE NO(S). 12-1 & 12-2

FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 97 min

TEST DIRECTOR George W. Kryger

TSC MONITOR Bernd W. A. Klein

Elapsed Distance 12 mi 4979', odom
12 mi 5253 5th

START 1650 -
END 1820

TEST DATA LOG

TEST RUN NO. 13 SHEET NO. 1 OF 1

TYPE OF TEST: FIXED ROUTE DATE: 1-13-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: Hoffman Fixed Route

EVENT MARKER NUMBER: TIME POINTS 1-15 IN ORDER
Checkpoints 1-76 IN ORDER

Door closed at
TP 2
TP 4
TP 6
TP 8
TP 10
TP 11
TP 13

Heavy Traffic

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1-55 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 24°F PRECIPITATION: NO ROAD CONDITIONS: DRY

TEST TAPE NO(S). 13-1 and 13-2 FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 90 min

TEST DIRECTOR George W Gruver

TSC MONITOR Bernd W. A. Kliem

Elapsed Distance - ODOM 13 90
" " 5th 13 129

START 2025
END 2140

TEST DATA LOG

TEST RUN NO. 14 SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 FIXED ROUTE DATE: 1-13-77.

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: HI^3 FIXED ROUTE

EVENT MARKER NUMBER: Time Points 1-15 in order
Checkpoints 1-76 in order.

Door Close at Time points:
TP 2
TP 3 Missed Turn #16
TP 4
TP 9 Error {TD 15 at ODOM = 210
TP 10 {EE 15 at ODOM = 2290
TP 11
TP 12
TP 13

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 24°F PRECIPITATION: None ROAD CONDITIONS: Dry

TEST TAPE NO(S). 14-1 and 14-2 FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR

RUN TIME: 75 min

DISTANCE: Odom 12 mi 5245'
5th 13 mi 9'

TSC MONITOR

START 2200
END 2310

TEST DATA LOG

TEST RUN NO. 15 SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 Fixed Route DATE: 1-13-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: HI^3 Fixed Route

EVENT MARKER NUMBER: Time Points 1-15 in Sequence
Checkpoints 1-76 in Sequence

Door Closed AT
TP 2
TP 6
TP 8
TP 10
TP 11
TP 12
TP 14
TP 15

1. Marked CP 25 wrong
Removed with EE 25

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 23° F PRECIPITATION: None ROAD CONDITIONS: Dry

TEST TAPE NO(S). 15-1 and 15-2 FILE NO.

SAMPLE RATE: 0.5

RUN TIME: ~~9~~ 70 min

TEST DIRECTOR George Gruver

TSC MONITOR W A Klein

Elapsed Distance
Odom 12 mi 5175'
5th 13 mi 17'

START 2320 1/13/77
END 0030 1/14/77

TEST DATA LOG

TEST RUN NO. 16 SHEET NO. 1 OF 1

TYPE OF TEST: FIXED ROUTE DATE: 1-13-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: Hoffman Fixed Route

EVENT MARKER NUMBER: Time Points 1-15 in Order
Checkpoints 1-76 in order

Door Closed AT
TP 1
TP 3
TP 4
TP 9
TP 12
TP 13
TP 14

1. Input TD 11 in error instead of Turn 24. Removed TD 11 with EE11. First TD11 entry is correct.
2. Missed Turn 24
3. Hit TD15 in error at Odom = 2066 (11th SP) Removed with EE15.

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 - 55 2 - 72 3 - 82

ODOMETER CAL: 779 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/ [✓ On] OTHER:

TEMPERATURE: 23° PRECIPITATION: none ROAD CONDITIONS: Dry

TEST TAPE NO(S). 16-1 and 16-2 FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 70" TEST DIRECTOR George W [illegible]

Distance: Odom 12 mi 5172', TSC MONITOR [illegible] A. Klein
5th 12 mi 5255

START 0850
END 1015

TEST DATA LOG

TEST RUN NO. 17 SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 Fixed Route DATE: 1-14-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER: TSC Time points 1-15 in order
DoorClose AT TSC checkpoints 1-16 in order
TP 2
TP 3 Missed TD 11 ENTRY
TP 4
TP 6
TP 8
TP 9
TP 13
TP 14

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/ [✓ On] OTHER:

TEMPERATURE: 30°F PRECIPITATION: NONE ROAD CONDITIONS: Dry

TEST TAPE NO(S). 17-1 & 17-2 FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W Greene

RUN TIME: 85 min

TSC MONITOR Bernd W.A. Klein

Distance: ODOM 12mi 5074
5th 12mi 5245

TO2

T E S T   D A T A   L O G

START 1020
END 1200

TEST RUN NO. 18
SHEET NO. 1 OF 1

TYPE OF TEST: Fixed Route
DATE: 1-14-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door closed AT	1. Hit TA 20 ≈ 150 feet late
TP 3	
TP 4	2. Missed CP 43
TP 6	
TP 8	3. Snowing hard at CP40
TP 9	
TP 11	4 Pictures on Walnut.
TP 13	
TP	
TP	

EQUIPMENT UTILIZED/TEST CONDITION:
VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 .55 2 .72 3 .87
ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2
R1 DROPOUT SWITCH: Off/ [✓ On]
OTHER:

TEMPERATURE: 32-30° PRECIPITATION: SNOWING ROAD CONDITIONS: Dry - THEN WET
TEST TAPE NO(S). 18-1 & 18-2
FILE NO.
SAMPLE RATE: 0.5
TEST DIRECTOR George W Gruver
RUN TIME: 100 Min
TSC MONITOR Bernd W.A. Klein
DISTANCE: odom 12-5140
5th 12.5248

TEST DATA LOG

START 1330
END 1535

TEST RUN NO. 19 SHEET NO. 1 OF 1

TYPE OF TEST: FIXED Route DATE: 1-14-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION: Huffman Fixed Route

EVENT MARKER NUMBER:

Door Closed AT
TP 8
TP 9
TP 10
TP 12
TP 14

1. HIT CP 2 ≈ 50' late
2. Some sliding of 5th wheel.
3. HIT TA 20 ≈ 50' late
4. Stopped recording at Post Office for 2-3 minutes. Turned into Post Office Entry at 30th & Market.

- SNOW ACCUMULATION ≈ 1-2" - SNOW + SLUSH STUCK TO 5th WHEEL — A 1/8" BUILD-UP OF SNOW CONTRIBUTES UP TO 0.88% ERROR (AS A REDUCTION)

- TIME POINTS - STOPPING & PASSING WAS CHOOSEN BY TRAFFIC AND SET OF LIGHTS!

5. SUBSEQUENTLY FOUND THAT TAPE WOULD NOT DUMP WITH PRUMP ROUTINE! BK 1/18/77

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.:

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -87

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 31-32° PRECIPITATION: SNOWING ROAD CONDITIONS: Snowy & ~~[illegible]~~ WET.

TEST TAPE NO(S). 19-1 & 19-2 FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W [illegible]

RUN TIME: 2 HR - 05 MIN

TSC MONITOR B. [illegible]

DISTANCE: ODOM 13 mi 201
5th < 13 mi

TEST DATA LOG

START 1600
END 1730

TEST RUN NO. 20

SHEET NO. 1 OF 1

TYPE OF TEST: Fixed Route

DATE: 1-14-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed AT
TP 4
TP 7
TP 8
TP 9

1. Missed CP 37

2. Generator stopped just after CP #46 at time 1730 hours.

Incomplete Run TERMINATED! BK

5th WHEEL DISTANCE & ODOMETER UNKNOWN - INDICATORS WENT BLANK WHEN POWER FAILED.

3. ~~46~~ TAPE's DUMPED SUCCESSFULLY THROUGH CP 46 USING "FRUMP": HOWEVER, ABILITY TO TRANSFER TO MAG. TAPE (DUE TO LACK OF END-OF-FILE) TO BE DETERMINED! BK. 1/16/77

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On]

OTHER:

TEMPERATURE: 32 PRECIPITATION: Snowing ROAD CONDITIONS: 1/2-1 inch slush

TEST TAPE NO(S). 20-1 & 20-2

FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 1 HR - 30 MIN

DISTANCE: ODOM ?
5th ?

TEST DIRECTOR George W Gruver

TSC MONITOR W. A. Klein

TEST DATA LOG

START 18:00
END 19:30

TEST RUN NO. 21

SHEET NO. 1 OF 1

TYPE OF TEST: Fixed Route

DATE: 1-14-77

BRIEF NARRATIVE DESCRIPTION OF TEST — NOTE CONCERNING THE OPERATION OF THE 5th WHEEL IN THE SNOW! WHERE THE 5th WHEEL RUNS THE SNOW/SLUSH IS 3" TO 5" PLUS LARGE CLUMPS — PILED UP BY THE VEHICLES — THIS CAUSES THE 5th WHEEL TO BOUNCE — IN ADDITION, THE 5th WHEEL WILL PICK UP SNOW ≈ 1/4" THK AND THE SHED IT AT ABOUT 15 MPH. THE 5th WHEEL, DURING DECELERATION OF THE TEST VEHICLE, WILL SLIDE LEFT OR RIGHT!

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed AT
TP 3
TP 4
TP 8
TP 9
TP 10
TP 11
TP 13
TP 14

1. MANUAL FIX — TO CONTROL THE BUTTERFLY ON THE AUTOMATIC CHOKE — WIRED OPEN!
2. at ODOM= 4800 HIT CP66 IN error and CP 7 at wrong place. Removed both with EE! Hit CP7 at right Place but missed CP6 completely.
3. Entered CP111 in error at location of CP11. Removed with EE. Missed CP11.
4. Entered TA16 in error at TA6 (Missed TA6)
5. Entered CP28 early, deleted with EE.
6. CP47 in error.

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -89

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off [✓ On]

OTHER:

TEMPERATURE: 33°F PRECIPITATION: Lt. Snow ROAD CONDITIONS: 2" snow & slush

TEST TAPE NO(S). 21-1 and 21-2

FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W.

RUN TIME: 90 min

TSC MONITOR Bend W. A. Klein

DISTANCE: ODOM 13mi 347'
5th 12mi 4799

TEST DATA LOG

START 2040
END 2155

TEST RUN NO. 22

SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 Fixed Route

DATE: 1-14-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed AT
TP 1
TP 3
TP 9
TP 10
TP 12
TP 13
TP 14

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 579 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 33° PRECIPITATION: Freezing Rain & Snow ROAD CONDITIONS: 1-2 inches Slush

TEST TAPE NO(S). 22-1 and 22-2

FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W Gruver

TSC MONITOR Bernd W.A. Klein

RUN TIME: 1 HR - 15 MIN.

DISTANCE: ODOM 13^{M}-350'
5th 12^{M}-4280'

START 2200
2nd 2320

TEST DATA LOG

TEST RUN NO. 23 SHEET NO. 1 OF

TYPE OF TEST: HI^3 Fixed Route DATE: 1-14-77.

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed At
TP1
TP3
TP7
TP9
TP11
TP13
TP15

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 - 55 2 - 72 3 - 82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off [✓ On] OTHER:

TEMPERATURE: 32° PRECIPITATION: Freezing Rain ROAD CONDITIONS: 1-2 inches slush

TEST TAPE NO(S). 23-1 and 23-2 FILE NO.

SAMPLE RATE: 0-5

TEST DIRECTOR George W. [illegible]

RUN TIME: 80 Min

TSC MONITOR [illegible] W.A. Klein

Distance: Odometer 13 - 418
5th wheel 12 - 4366

START: 23:30
End: 00:45

TEST DATA LOG

TEST RUN NO. 24 SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 Fixed Route DATE: 1-14-77/1-15-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed at
TP 2
TP 3
TP 4
TP 5
TP 6
TP 11
TP 14
TP

1. marked CP 51 60' late

2. Entered TD12 twice. Removed one with EE.

3. 5th Wheel calibration affected by build up of slush on roadways?

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 32° F PRECIPITATION: Freezing Rain ROAD CONDITIONS: 2 inches of Slush

TEST TAPE NO(S). 24-1 and 24-2 FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 75 min 1 HR-15 MIN TEST DIRECTOR George W [illegible]

Distance: Odometer: 13 M - 416' TSC MONITOR Bernard A. Klein
5th 12 M - 606'

START 0050
END 0210

TEST DATA LOG

TEST RUN NO. 25 SHEET NO. 1 OF 1

TYPE OF TEST: HI³ Fixed Route DATE: 1-15-76

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed AT
TP1
TP3
TP4
TP8
TP12
TP14

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/ [✓ On] OTHER:

TEMPERATURE: 32°F PRECIPITATION: Light RAIN ROAD CONDITIONS: 1/2-to-1 inch Slush

TEST TAPE NO(S). 25-1 and 25-2 FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR

RUN TIME: 1 HR - 20 MIN.

TSC MONITOR

DISTANCE: Odometer 13mi 338'
5th: 13mi 4764'

TEST DATA LOG

START 1035
END 1200

TEST RUN NO. 26

SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 FIXED ROUTE

DATE: 1-15-76

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door closed AT
TP 2
TP 4
TP 6
TP 8
TP 11
TP
TP
1

1. at 1112 5th wheel stopped counting at 6 mi 771 feet Odom was ≈ 6 mi 1119 feet
2. Stopped vehicle – found wet connector at 5th wheel. repaired, taped, and ran 5th wheel to 6 mile 919 feet (200 feet less than Odometer) at CP34 (Odom – 5th) was 198 feet. Halted Computer therefore moving 5th wheel count up had no effect on recording, only on display read out leds.
3 Missed Time Point 15. (DID NOT ENTER UM TERMINAL)

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 777 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/ [✓ On]

OTHER:

TEMPERATURE: 33° F PRECIPITATION: NONE ROAD CONDITIONS: WET & SLUSH

TEST TAPE NO(S). 26-1 and 26-2

FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR

RUN TIME: 1 HR - 25 MIN

TSC MONITOR W. A. Klein

Distance: odometer 13 mi 179'
5th wheel

TEST DATA LOG

START 1210
END 1322

TEST RUN NO. 27 SHEET NO. 1 OF

TYPE OF TEST: HI^3 Fixed Route DATE: 1-15-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door closed AT

TP 2

TP 4

TP 5

TP 8

TP 9

TP 10

TP 11

TP 12

1. Entered CP 48 too soon - removed with EE.

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 - 55 2 - 72 3 - 82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 34°F PRECIPITATION: None ROAD CONDITIONS: wet / slush

TEST TAPE NO(S). 27-1 and 27-2 FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 1hr 12 min (72 MIN)

Distance; Odometer 13mi 80

5th Wheel

TEST DIRECTOR George Gruver

TSC MONITOR

TEST DATA LOG

START 1330
END 1455

TEST RUN NO. 28 SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 Fixed Route DATE: 1-15-77.

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed AT
TP 1
TP 4
TP 9
TP 10
TP 13
TP 15
TP

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 38°F PRECIPITATION: None ROAD CONDITIONS: wet & slush

TEST TAPE NO(S). 28-1 and 28-2 FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 1 hr 25 min

TEST DIRECTOR George W. [illegible]

TSC MONITOR Bernd W. A. Klein

Distance: Odometer 13 mi 0 ft.
5th wheel

START 1500
END 1620

TEST DATA LOG

TEST RUN NO. 29 SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 FIXED ROUTE DATE: 1-15-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed AT
TP2
TP3
TP4
TP9
TP10
TP11
TP13
TP14

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/On OTHER:

TEMPERATURE: 37 F PRECIPITATION: NONE ROAD CONDITIONS: WET & SLUSH

TEST TAPE NO(S). 29-1 and 29-2 FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W Gruner

RUN TIME: 1 Hr - 20MIN

TSC MONITOR Bernard W.A.

Distance: Odometer 13 miles 8'
5th Wheel

START 1715
END 1838

TEST DATA LOG

TEST RUN NO. 30

SHEET NO. 1 OF 1

TYPE OF TEST: HI³ FIXED ROUTE

DATE: 1-15-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Closed Door At
TP1
TP2
TP3
TP4
TP6
TP9
TP11

1. Entered CP10 instead of TA10
at ODOM = 410 8 Plus x(4096)
missed TA 10-

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1-55 2 - 72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On]

OTHER:

TEMPERATURE: 34° F PRECIPITATION: NONE ROAD CONDITIONS:

TEST TAPE NO(S). 30-1 and 30-2

FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W. Church

RUN TIME: 1 hour 23 min.

TSC MONITOR Bernd W A Klein

Distance: odometer 13 mi 48'
5th wheel

START 1845
END 2010

TEST DATA LOG

TEST RUN NO. 31　　SHEET NO. 1 OF 2

TYPE OF TEST: HI^3 FIXED ROUTE　　DATE: 1-15-77.

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Closed Door AT
TP 1
TP 2
TP 8
TP 9
TP 11
TP 14

1. Noted ≈300 foot jump in 5th wheel after CP #3 on both DMI and CRT.

2. ADDITIONAL DATA SHEET 2OF2
B. Klein 4/18/77

EQUIPMENT UTILIZED/TEST CONDITION:　　VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 - 72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On]　　OTHER:

TEMPERATURE: 34°-32°F PRECIPITATION: None　ROAD CONDITIONS: Wet

TEST TAPE NO(S). 31-1 and 31-2　　FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 1 HR - 25 MIN　　TEST DIRECTOR George W. [illegible]

Distance: Odometer 13mi 5210 ft　　TSC MONITOR Bernd W. A. Klein
5th wheel 13mi 270 ft

Run #31

TEST DATA LOG CONTINUED!

SHEET
2 OF 2

HI^3 FIXED ROUTE

B. Klein 1/18/77

	Q	5	
CP2	757	759	Δ = 2x2 = 4'
CP3	1134	1135	Δ = 1x2 = 2'
0333.5	1268	1268	Δ = 0 0'
0334.5	1277	1281	Δ = 4x2 = 8'
0335.5	1287	1298	Δ = 9x2 = 18'
0336.5	1298	1314	Δ = 16x2 = 32'
0338.5	1315	1341	Δ = 26x2 = 52'
0340.5	1332	1369	Δ = 37x2 = 74'
0342.5	1350	1399	Δ = 49x2 = 98'
350.5	1426	1522	Δ = 96x2 = 192'
400.5	1500	1649	Δ = 149x2 = 298' ←
356.5	1472	1598	Δ = 126x2 = 252
[illegible]	1490	1625	Δ = 135x2 = 270
401.5	1513	1658	Δ = 145x2 = 290'
359.5	1498	1637	Δ = 139x2 = 278

For a period of 27 seconds, covering a distance of 464 feet, the 5th wheel gained 298 feet (Maximum of two pseudo-checkpoints.

Between 03'min 33.5"sec and 4'00.5" 5th wheel gained 298 feet on the odometer that is 300 feet in 27 seconds or 11.1 feet per second or ~~[illegible]~~

$27 \overline{)300}$ = 11.1
27
30

$\frac{60}{8} = 7.5$ miles per hour faster than the odometer. note 11.1 feet per second is more than 1 extra revolution per second.

START 2025
End 2150

TEST DATA LOG

TEST RUN NO. 32 SHEET NO. 1 OF 4

TYPE OF TEST: HI³ FIXED ROUTE DATE: 1-15-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER: 1. Most Roadways glazed ice noted that 5th wheel was losing many counts after roads were slightly glazed. BK

Closed Door AT
TP 1
TP 3
TP 4
TP 10
TP 12
TP 13

after completing run, checked calibration and found 5th wheel to be 874 versus 1000 ft for odometer. Inspection showed that one of the eight magnets on the fifth wheel was missing. On 1-16-77, replaced magnet and checked calibration. Results were: odometer - 1004 feet
5th wheel - 1000 feet.
with test made in ≈ 1/4-1/2 inches of slush with up to 0.25 inches of slush build up on 5th wheel.
SEE ALSO CALIBRATION SHEETS + RECALIBRATION! BK

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off [✓ On] OTHER:

TEMPERATURE: 32° F PRECIPITATION: None ROAD CONDITIONS: Wet - frozen

TEST TAPE NO(S). 32-1 and 32-2 FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W

RUN TIME: 1 Hr 25 MIN

TSC MONITOR Bernd W. A. Klein

Distance: Odometer 13 mi 160
5th wheel 12 mi 279

TEST RUN # 32 TEST DATA LOG

Ellamore Street Odometer Cal. 1-15-77

2340 hours

Street dry except on edge. SHEET 2 OF 4

(Run #1) - West Edge - some ice & slush

5th wheel coated ≈ [illegible]-1/4 inch of ice

odometer - 1004'

5th wheel 874'

odom	5th	Δ
0	0	
140	122	18
208	180	28
266	230	36
308	268	40
350	304	46
384	332	52
418	362	56
462	400	62
496	430	66
540	470	70
574	500	74
636	552	82
670	582	88
722	628	94
1004	874	130'

Run #1

(Run #2) 5th wheel Clean

Street Clean

Odom = 1006'

5th = 826'

Found One magnet missing

should reduce distance by 7/8

note 7/8 × 1004 = 878.5'

7/8 × 1006 = 880'

B. Klein 1/15/77

NIGHT CALIBRATION DATA — AFTER RUN #32 WHEN CONSISTENT LARGER 5th WHEEL ERROR (SMALLER READINGS WERE OBSERVED! BK

1025 hours

TEST DATA LOG

TEST RUN NO. #32 CONTINUED SHEET NO. 3 OF 4

TYPE OF TEST: Special DATE: 1-16-76

BRIEF NARRATIVE DESCRIPTION OF TEST Odometer and 5th wheel calibration AFTER RUN #32

ROUTE IDENTIFICATION: Delaware St. Test 1000' range
Snowing and slush on ground.
After replacing magnet on fifth wheel

EVENT MARKER NUMBER: See attached sheet.

CP 1 0000 000

↓

CP 2 1004 1000 ← on display

See attached Dump.

MAGNET REPLACING TIME = 20 MINUTES
5th WHEEL WAS WIPED CLEAN PRIOR TO CALIBRATION AT THE END OF THE 1000' ABOUT 1/8" OF SNOW AND ICE HAD ACCUMULATED. 5th WHEEL HAS SLITHERING/SLIDING TENTENCY - OBSERVED THROUGH REAR WINDOW OF WINNEBAGO!

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/ [✓ On] OTHER:

TEMPERATURE: 33° F PRECIPITATION: Snowing ROAD CONDITIONS: icy

TEST TAPE NO(S). N.A. FILE NO.

SAMPLE RATE: 0.5

RUN TIME: NA

TEST DIRECTOR George W. Grove

TSC MONITOR W. A. Klein

TEST DATA LOG

TEST RUN #32 CONTINUED SHEET 4 OF 4

```
.L FRUMP.LDA

.ST 14156

RUN 001  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 16  HOUR 10  MIN 25

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
CP 001     00     00     R1       O 00000     F 00000    T 00 03
TA 002     00     00     R1       O 00057     F 00057    T 00 17
TA 003     00     00     R1       O 00100     F 00101    T 00 21
TA 004     00     00     R1       O 00140     F 00140    T 00 24
TA 005     00 ' , 00     R1       O 00181     F 00180    T 00 28
TA 006     00     00     R1       O 00220     F 00220    T 00 31
TA 006     00     00     R1       O 00258     F 00257    T 00 35
TA 006     00     00     R1       O 00295     F 00295    T 00 38
TA 007     00     00     R1       O 00322     F 00321    T 00 41
TA 001     00     00     R1       O 00353     F 00353    T 00 44
TA 001     00     00     R1       O 00384     F 00384    T 00 47
TA 001     00     00     R1       O 00419     F 00419    T 00 50
TA 001     00     00     R1       O 00447     F 00446    T 00 53
TA 001     00     00     R1       O 00472     F 00471    T 00 56
TA 001     00     00     R1       O 00495     F 00494    T 01 00
CP 002     00     00     R1       O 00502     F 00500    T 01 03
DD 085     42     85     R2 E     O 01365     F 21845    T 08 03
DD 085
```

DATA DUMP AS DESCRIBED ON SHEET 3 OF 4

1/16/77

START 1010
END 1225

TEST DATA LOG

TEST RUN NO. 33

SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 Fixed Route

DATE: 1-16-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed AT
TP 4
TP 8
TP 9
TP 10
TP 11
TP 12
TP 13
TP 14

1. Tried 3 times to input D010 but would not show on display noted that cassette was not turning for period of 10-30 seconds then D0 10 was displayed and cassette started turning.

2. Subsequently found that failure to zero tapes prior to starting run caused inability to dump tape with the FRUMP routine. B.K. 1/18/77

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72 3 -82

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On]

OTHER:

TEMPERATURE: 26° F PRECIPITATION: SNOW ROAD CONDITIONS: 1/2-inch slush

TEST TAPE NO(S). 33-1 and 33-2

FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W. [illegible]

RUN TIME: 1 hour 15 min

TSC MONITOR Bernd W. A. Kliem

Odometer Distance 13mi 238'

5th Wheel Distance

START 1235
END 1405

TEST DATA LOG

TEST RUN NO. 34 SHEET NO. 1 OF 1

TYPE OF TEST: HI³ Fixed Route DATE: 1-16-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Loop Closed at	1. HIT DO 2, DC 2, and TD 2 at
TP 1	Broad in error. Entered EE 2
TP 3	three times. Entered TD 2
TP 5	correctly at 13th.
TP 7	2. Entered DO 15 and DC 15
TP 13	at 11th in error. Entered EE 15
TP 14	Twice. HIT DO 15, DC 15, and TD 15
TP 15	correctly at 12th.

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 812 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 26° F PRECIPITATION: Snowing ROAD CONDITIONS: 1 INCH SLUSH

TEST TAPE NO(S). 34-1 and 34-2 FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 1 hour 30 min TEST DIRECTOR

odometer Distance 13mi 364' TSC MONITOR

5th Wheel Distance

TEST DATA LOG

START 1415
END 1535

TEST RUN NO. 35

SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 FIXED ROUTE

DATE: 1-16-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

DOOR CLOSED AT:

TP4

TP5

TP8

TP9

TP10

TP11

TP12

TP13

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On]

OTHER:

TEMPERATURE: 26° F PRECIPITATION: SNOWING ROAD CONDITIONS: 1 INCH OF SLUSH

TEST TAPE NO(S). 35-1 and 35-2

FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W Gruver

RUN TIME: 1 hour 20 MIN

TSC MONITOR R. W. A. Klein

ODOMETER DISTANCE 13 mi 330'

5th Wheel Distance 12 mi 4952'

TEST DATA LOG START 1550
END 1705

TEST RUN NO. 36 SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 FIXED ROUTE DATE: 1-16-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:
TP 2
TP 4
TP 8
TP9
TP11
TP 12
TP13
TP14

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/ [✓ On] OTHER:

TEMPERATURE: 28°-26 °F PRECIPITATION: light blowing snow ROAD CONDITIONS: 1 INCH SLUSH

TEST TAPE NO(S). 36-1 and 36-2 FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 27' TEST DIRECTOR George W Grove

ODOMETER DISTANCE [redacted] 13 miles 170 TSC MONITOR R. W. A. Klein

5th wheel Distance [redacted] 12 mi 5100

TEST DATA LOG

START 1715
END 1830

TEST RUN NO. 37

SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 FIXED ROUTE

DATE: 1-16-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed AT	1. Entered CP30 after TP 7 in
TP 2	addition to its normal location.
TP 3	Entered EE30 after CP31.
TP 8	
TP 9 *	2.* AT TP 9. Vehicle Failed to
TP 10	stop after Door was open. Closed
TP 12	Door and entered TP 9 while moving
TP 13	

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On]

OTHER:

TEMPERATURE: 26°F PRECIPITATION: None ROAD CONDITIONS: ½-1 inch of slush

TEST TAPE NO(S). 37-1 and 37-2

FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR

RUN TIME: 1 hour 15 min

TSC MONITOR

Elapsed Odometer Distance 13mi 260'

Elapsed 5th Wheel Distance

T E S T   D A T A   L O G   START 2040
END 2150

TEST RUN NO. 38   SHEET NO. 1 OF 1

TYPE OF TEST: HI³ FIXED ROUTE   DATE: 1-16-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door closed AT
TP3
TP4
TP8
TP9
TP 10
TP 11
TP 13

1-Entered CP71 accidently
≈ 2 blocks early. Used EE 71.
Entered CP71 correctly.

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979   FPP 2   5TH WHEEL CAL 872   FPP 2

R1 DROPOUT SWITCH: Off/[✓ On]   OTHER:

TEMPERATURE: 15° F   PRECIPITATION: NONE   ROAD CONDITIONS: 1 INCH slush

TEST TAPE NO(S). 38-1 and 38-2   FILE NO.

SAMPLE RATE: 0.5

RUN TIME: 1H-10MIN   TEST DIRECTOR George W. [illegible]

ODOMETER DISTANCE 13mi 250'   TSC MONITOR [illegible] W. [illegible]

5th wheel distance 12mi 5000'

START 1015
END 1145

TEST DATA LOG

TEST RUN NO. 39 SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 FIXED ROUTE DATE: 1-17-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

DOOR CLOSED AT
TP 2
TP 3
TP 4
TP 5
TP 6
TP 8
TP 11
TP 13

1. Overnight temperatures (signposts) were 0°F with wind chill factor -42°F.

2. Entered CP#27 at 20th St. in error (should have been just prior to 19th). Entered EE27 and then entered CP#27 at correct location

4. Received overlays from 13,16 and 15,16 at 7th and Market as off-route declaration.
13,16 at 7th and Ranstead
15,16 at 7th and Filbert.

5. Entered CP 58 ≈ 50 feet late

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/ [✓ On] OTHER:

TEMPERATURE: 8° PRECIPITATION: NONE ROAD CONDITIONS: ICE AND SLUSH

TEST TAPE NO(S). 39-1 and 39-2 FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR

RUN TIME: 1HR - 30MIN

TSC MONITOR

DISTANCE: Odometer 13mi 230
5th wheel 12mi 5125

TEST DATA LOG

START 1215
END 1340

TEST RUN NO. 40

SHEET NO. 1 OF 1

TYPE OF TEST: HI³ FIXED ROUTE

DATE: 1-17-77

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

DOOR CLOSED AT
TP 2
TP 3
TP 4
TP 5
TP 10
TP 11
TP 12

EQUIPMENT UTILIZED/TEST CONDITION:

VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/On

OTHER:

TEMPERATURE: 8 °F

PRECIPITATION: none

ROAD CONDITIONS: ice and slush

TEST TAPE NO(S). 40-1 and 40-2

FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W. Grayer

RUN TIME: 1 hour 25 min.

Elapsed Distance Odometer 13mi 320
5th 12mi 5190

TSC MONITOR Bernard A. Khan

TEST DATA LOG

START 1535
END 1715

TEST RUN NO. 41 SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 FIXED ROUTE DATE: 1-17-77.

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Door Closed at

TP 1
TP 2
TP 3
TP 10
TP 12
TP 13
TP 14

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 12° F PRECIPITATION: None ROAD CONDITIONS: Wet/icy

TEST TAPE NO(S). 41-1 and 41-2 FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W [illegible]

RUN TIME: 1 HR - 40 MIN.

TSC MONITOR [illegible]

Odometer distance 13 mi 130'

5th Wheel Distance

TEST DATA LOG START 1855 END 2010

TEST RUN NO. 42 SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 FIXED ROUTE DATE: 1-17-77.

BRIEF NARRATIVE DESCRIPTION OF TEST

ROUTE IDENTIFICATION:

EVENT MARKER NUMBER:

Closed Door AT
TP 3
TP 4
TP 9
TP 10
TP 11
TP 12
TP 13

1. Entered CP40 at 12th in error. Entered EE40. Entered CP40 correctly at 13th.

2. Hit TD15 1 block early. Entered EE15 and then TD15 at correct location.

EQUIPMENT UTILIZED/TEST CONDITION: VEHICLE UNIT NO.: 1

VEHICLE UNIT THRESHOLD LEVELS: 1 -55dBm 2 -72dBm 3 -82dBm

ODOMETER CAL: 979 FPP 2 5TH WHEEL CAL 872 FPP 2

R1 DROPOUT SWITCH: Off/[✓ On] OTHER:

TEMPERATURE: 12° F PRECIPITATION: None ROAD CONDITIONS: wet/icy to dry

TEST TAPE NO(S). 42-1 and 42-2 FILE NO.

SAMPLE RATE: 0.5

TEST DIRECTOR George W [illegible]

RUN TIME: 1 HR 15 MIN

TSC MONITOR [illegible] A. [illegible]

ELAPSED DISTANCE
ODOMETER 13mi 20cl
5th wheel

START 2030
END 2140

TEST DATA LOG

TEST RUN NO. 43

SHEET NO. 1 OF 1

TYPE OF TEST: HI^3 FIXED ROUTE

DATE: 1-17-77

EVENT MARKER NUMBER (~~Cont'd~~):

TP

Door Closed At
TP 4
TP 6
TP 8
TP 10
TP 11
TP 14

Odometer Cal 979 FPP 2
5th wheel Cal 872 FPP 2
L1 = -55dBm
L2 = -72dBm
L3 = -82dBm
Vehicle Unit #1
RI prepont Switch ON
Temperature: 12°F
Road Conditions: Dry -to- icy
Precipitation: None
Sample Rate: 0.5 sec.

TEST TAPES: 43-1 and 43-2

Elapsed odometer: 13mi 150 feet
Elapsed 5th wheel:

RUN TIME: 1 hour 10 min

FILE NO.

REMARKS: RAN OUT OF THE 'NORMAL' DATA SHEETS
BK

Test Director George W. [illegible]
TSC monitor [illegible]

4.1.2 Fixed Route Test Data

This subsection contains a complete listing of the data recorded during Fixed Route Run 27 . As in the case of random route data , only records which contain signpost code changes and event markers are listed. The first page of data recorded during Runs 11-18 , 20-32 , and 34-43 are also included. Runs 19 and 33 were identified as bad tapes at the time of the tests. Runs 41-43 were run to replace these Runs plus Run 32 , during which a magnet was lost from the fifth wheel.

Typical Fixed Route Data Listing

1/18/77 B. Klein

```
L FRAMP.LDA

.ST 14155

RUN 027  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 15  HOUR 12  MIN 10

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TR 001   00   00   R1     D 00004   F 00004   T 00 13        000   14   08   R1     D 02974   F 02896   T 47 22
TR 002   00   00   R1     D 00074   F 00075   T 00 23        000   14   08   R1 D   D 02990   F 02912   T 47 36
   000   17   13   R1     D 00114   F 00112   T 00 23        000   14   08   R1     D 02992   F 02914   T 47 36
   000   17   13   R1 D   D 00119   F 00117   T 00 23        000   14   08   R1 D   D 02999   F 02922   T 47 37
   000   17   13   R1     D 00124   F 00122   T 00 29        000   14   08   R1     D 03003   F 02926   T 47 38
CP 001   17   13   R1     D 00134   F 00132   T 00 30     TR 019   14   08   R1     D 03035   F 02957   T 47 42
TD 001   17   13   R1     D 00213   F 00216   T 00 37        000   14   08   R1 D   D 03043   F 02971   T 47 44
   000   17   13   R1 D   D 00255   F 00253   T 00 40        000   14   08   R1     D 03051   F 02974   T 47 44
   000   17   13   R1     D 00261   F 00259   T 00 40     DO 009   14   08   R1     D 03103   F 03027   T 47 52
   000   17   13   R1 D   D 00274   F 00271   T 00 41     DC 009   14   08   R1     D 03106   F 03030   T 47 59
   000   17   13   R1     D 00280   F 00277   T 00 42     TD 009   14   08   R1     D 03122   F 03046   T 48 03
   000   17   13   R1 D   D 00325   F 00323   T 00 45        000   14   08   R1 D   D 03137   F 03062   T 48 05
   000   17   13   R1     D 00332   F 00330   T 00 46        000   14   08   R1     D 03142   F 03067   T 48 06
TR 003   17   13   R1     D 00471   F 00470   T 01 23        000   14   08   R1 D   D 03183   F 03103   T 48 09
CP 002   17   13   R1     D 00766   F 00766   T 02 03        000   14   08   R1     D 03190   F 03115   T 48 09
CP 003   17   13   R1     D 01139   F 01139   T 02 33     TR 020   14   08   R1     D 03373   F 03303   T 48 23
   000   14   06   R1     D 01754   F 01753   T 04 35     CP 041   14   08   R1     D 03534   F 03462   T 49 12
CP 004   14   06   R1 D   D 01767   F 01766   T 04 36     TR 021   14   08   R1     D 03662   F 03589   T 49 27
   000   14   06   R1     D 01773   F 01772   T 04 37     CP 042   14   08   R1     D 03737   F 03717   T 49 39
DO 002   14   06   R1     D 01869   F 01863   T 04 43     TR 022   14   08   R1     D 03863   F 03796   T 49 47
DC 002   14   06   R1     D 01870   F 01870   T 04 51     CP 043   14   08   R1     D 00031   F 04054   T 50 27
TD 002   14   06   R1     D 01894   F 01894   T 04 56     TR 023   14   08   R1     D 00173   F 04196   T 50 55
   000   14   06   R1 D   D 01910   F 01910   T 04 59     CP 044   14   08   R1     D 00506   F 04529   T 51 43
TR 004   14   06   R1     D 01913   F 01913   T 04 59     CP 045   14   08   R1     D 00842   F 04864   T 52 12
   000   14   06   R1 D   D 01930   F 01931   T 05 02     CP 046   14   08   R1     D 01127   F 05143   T 52 46
   000   14   06   R1     D 01933   F 01934   T 05 03        000   15   11   R1     D 01335   F 05406   T 53 05
CP 005   14   06   R1     D 02159   F 02160   T 06 25        000   15   11   R1 D   D 01407   F 05423   T 53 07
CP 006   14   06   R1     D 02337   F 02333   T 06 50        000   15   11   R1     D 01415   F 05436   T 53 07
CP 007   14   06   R1     D 02595   F 02596   T 07 35        000   15   11   R1 D   D 01546   F 05557   T 53 13
   000   10   06   R3 N   D 02602   F 02602   T 07 36        000   15   11   R1     D 01550   F 05572   T 53 13
CP 008   10   06   R3 N   D 02882   F 02881   T 08 06     DO 010   15   11   R1     D 01572   F 05593   T 53 23
CP 009   10   06   R3 N   D 03536   F 03533   T 09 37     DC 010   15   11   R1     D 01572   F 05593   T 53 35
CP 010   10   06   R3 N   D 03880   F 03877   T 10 08        000   15   11   R1 D   D 01574   F 05596   T 53 37
CP 011   10   06   R3 N   D 00006   F 04093   T 10 23        000   15   11   R1     D 01576   F 05597   T 53 38
   000   15   13   R1     D 00273   F 04370   T 10 50     TD 010   15   11   R1     D 01580   F 05602   T 53 39
TD 003   15   13   R1     D 00416   F 04507   T 11 04        000   15   11   R1 D   D 01616   F 05637   T 53 43
   000   15   13   R1 D   D 00447   F 04533   T 11 06        000   15   11   R1     D 01622   F 05643   T 53 44
   000   15   13   R1     D 00453   F 04544   T 11 07     CP 047   15   11   R1     D 01790   F 05812   T 54 14
   000   15   13   R1 D   D 00505   F 04596   T 11 10     CP 048   15   11   R1     D 02109   F 06131   T 54 43
   000   15   13   R1     D 00513   F 04604   T 11 11     CE 048   15   11   R1     D 02163   F 06190   T 54 49
   000   14   13   R3 N   D 00692   F 04734   T 11 28     CP 049   15   11   R1     D 02329   F 06352   T 55 00
CP 012   14   13   R3 N   D 00821   F 04912   T 11 43     CP 050   15   11   R1     D 02315   F 06333   T 55 40
TR 005   14   13   R3 N   D 00893   F 04933   T 11 51     CP 051   15   11   R1     D 03193   F 07213   T 56 05
CP 013   14   13   R3 N   D 01113   F 05201   T 12 20     CP 052   15   11   R1     D 03510   F 07535   T 56 27
CP 014   14   13   R3 N   D 01332   F 05419   T 12 43        000   19   13   R1     D 03646   F 07671   T 56 36
CP 015   14   13   R3 N   D 01554   F 05651   T 13 07     DO 011   19   13   R1     D 03795   F 07820   T 57 03
CP 016   14   13   R3 N   D 01736   F 05879   T 13 25     DC 011   19   13   R1     D 03800   F 07826   T 57 13
TR 006   14   13   R3 N   D 01954   F 06039   T 13 39        000   19   13   R1 D   D 03802   F 07828   T 57 13
CP 017   14   13   R3 N   D 02460   F 06543   T 14 13        000   19   13   R1     D 03803   F 07829   T 57 14
CP 018   14   13   R3 N   D 02514   F 06593   T 14 22     TD 011   19   13   R1     D 03813   F 07839   T 57 16
   000   12   06   R1     D 02642   F 06725   T 14 33     TR 024   19   13   R1     D 03831   F 07856   T 57 19
DO 004   12   06   R1     D 02753   F 06842   T 14 49        000   19   13   R1 D   D 03840   F 07863   T 57 20
DC 004   12   06   R1     D 02753   F 06842   T 15 06        000   19   13   R1     D 03844   F 07868   T 57 20
TD 004   12   06   R1     D 02773   F 06861   T 15 15     CP 053   19   13   R1     D 00003   F 08123   T 57 43
   000   12   06   R1 D   D 02813   F 06897   T 15 19     CP 054   19   13   R1     D 00252   F 08371   T 58 02
   000   12   06   R1     D 02820   F 06903   T 15 19     TR 025   19   13   R1     D 00273   F 08391   T 58 05
CP 019   12   06   R1     D 03227   F 07311   T 16 03     CP 055   19   13   R1     D 00602   F 08719   T 58 34
TR 007   12   06   R1     D 03307   F 07389   T 16 12     CP 056   19   13   R1     D 01125   F 09243   T 59 26
CP 020   12   06   R1     D 03976   F 08041   T 17 41     CP 057   19   13   R1     D 01403   F 09522   T 59 43
CP 021   12   06   R1     D 00632   F 08733   T 20 03        000   16   11   R1     D 01959   F 10079   T 60 34
CP 022   12   06   R1     D 01022   F 09159   T 21 55        000   16   11   R1 D   D 01963   F 10083   T 60 35
   000   06   03   R1     D 01103   F 09240   T 22 48        000   16   11   R1     D 01967   F 10087   T 60 35
TD 005   06   03   R1     D 01243   F 09377   T 23 00     DO 012   16   11   R1     D 02109   F 10229   T 60 43
   000   06   03   R1 D   D 01297   F 09424   T 23 04        000   16   11   R1 D   D 02116   F 10236   T 60 51
   000   06   03   R1     D 01303   F 09430   T 23 05        000   16   11   R1     D 02116   F 10236   T 60 51
TR 008   06   03   R1     D 01323   F 09450   T 23 07        000   16   11   R1 D   D 02116   F 10236   T 60 59
CP 023   06   03   R1     D 01595   F 09722   T 23 24        000   16   11   R1     D 02116   F 10236   T 61 00
TR 009   06   03   R1     D 01729   F 09854   T 23 38     DC 012   16   11   R1     D 02116   F 10236   T 61 01
TD 010   06   03   R1     D 02053   F 10130   T 24 25        000   16   11   R1 D   D 02117   F 10237   T 61 02
CP 024   06   03   R1     D 02206   F 10332   T 25 03        000   16   11   R1     D 02118   F 10239   T 61 03
CP 025   06   03   R1     D 02322   F 10943   T 25 46     TD 012   16   11   R1     D 02120   F 10240   T 61 03
   000   06   06   R3 E   D 03213   F 11343   T 26 09     CP 058   16   11   R1     D 02551   F 10673   T 61 33
TR 011   06   06   R3 E   D 03245   F 11370   T 26 11     CP 059   16   11   R1     D 02756   F 10877   T 62 31
   000   06   06   R1     D 03329   F 11453   T 26 13     CP 060   16   11   R1     D 03041   F 11162   T 63 01
TD 006   06   06   R1     D 03424   F 11547   T 26 27     CP 061   16   11   R1     D 03211   F 11331   T 63 17
   000   06   06   R1 D   D 03434   F 11557   T 26 29     TR 026   16   11   R1     D 03269   F 11389   T 63 26
   000   06   06   R1     D 03436   F 11559   T 26 29     CP 062   16   11   R1     D 03536   F 11655   T 64 17
DO 006   06   06   R1     D 03450   F 11573   T 26 38     CP 063   16   11   R1     D 03816   F 11935   T 64 43
DC 006   06   06   R1     D 03450   F 11573   T 26 41     CP 064   16   11   R1     D 03951   F 12080   T 64 57
TR 012   06   06   R1     D 03486   F 11609   T 26 51     TR 027   16   11   R1     D 04027   F 12147   T 65 17
CP 026   06   06   R1     D 03940   F 12062   T 27 36     CP 065   16   11   R1     D 00141   F 12353   T 66 09
CP 027   06   06   R1     D 00320   F 12539   T 28 40     CP 066   16   11   R1     D 00366   F 12582   T 66 33
TR 013   06   06   R1     D 00345   F 12564   T 28 44        000   13   13   R1     D 00453   F 12669   T 66 41
CP 028   06   06   R1     D 00581   F 12798   T 29 09        000   13   13   R1 D   D 00550   F 12766   T 66 49
CP 029   06   06   R1     D 00843   F 13064   T 29 50        000   13   13   R1     D 00555   F 12772   T 66 49
TR 014   06   06   R1     D 01232   F 13447   T 30 22     TD 013   13   13   R1     D 00586   F 12802   T 66 52
TR 015   06   06   R1     D 01531   F 13750   T 30 45        000   13   13   R1 D   D 00604   F 12821   T 66 54
CP 030   06   06   R1     D 01974   F 14194   T 32 06        000   13   13   R1     D 00609   F 12826   T 66 55
   000   16   13   R1     D 02092   F 14313   T 32 16     CP 067   13   13   R1     D 01136   F 13354   T 68 36
   000   16   13   R1 D   D 02206   F 14426   T 32 27     CP 068   13   13   R1     D 01337   F 13554   T 68 51
   000   16   13   R1     D 02209   F 14430   T 32 28     CP 069   13   13   R1     D 01809   F 14026   T 69 45
TD 007   16   13   R1     D 02213   F 14434   T 32 28     TR 028   13   13   R1     D 02050   F 14266   T 70 07
CP 031   16   13   R1     D 02673   F 14899   T 33 52     CP 070   13   13   R1     D 02253   F 14473   T 70 43
CP 032   16   13   R1     D 03093   F 15313   T 34 26        000   03   07   R1     D 02375   F 14599   T 70 52
CP 033   16   13   R1     D 03434   F 15653   T 34 53        000   03   07   R1 D   D 02383   F 14602   T 70 53
CP 034   16   13   R1     D 03887   F 16104   T 35 37        000   03   07   R1     D 02395   F 14603   T 70 54
CP 035   16   13   R1     D 00240   F 00170   T 36 50     TD 014   03   07   R1     D 02509   F 14723   T 71 19
TR 016   16   13   R1     D 00474   F 00403   T 37 09        000   03   07   R1 D   D 02525   F 14740   T 71 22
   000   12   10   R3 W   D 00501   F 00429   T 37 12     TR 029   03   07   R1     D 02523   F 14743   T 71 22
   000   12   10   R1     D 00729   F 00653   T 37 30     CP 071   03   07   R1     D 03160   F 15377   T 72 59
DO 003   12   10   R1     D 00750   F 00673   T 37 37     TR 030   03   07   R1     D 03191   F 15410   T 73 23
DC 003   12   10   R1     D 00771   F 00693   T 37 47     CP 072   03   07   R1     D 03440   F 15653   T 74 41
TD 008   12   10   R1     D 00814   F 00743   T 37 52     TR 031   03   07   R1     D 03891   F 16099   T 75 31
   000   12   10   R1 D   D 00843   F 00772   T 37 55     CP 073   03   07   R1     D 04095   F 16315   T 76 19
   000   12   10   R1     D 00848   F 00777   T 37 56     CP 074   03   07   R1     D 00447   F 00380   T 77 59
TR 017   12   10   R1     D 01173   F 01100   T 41 36     CP 075   03   07   R1     D 00389   F 00322   T 78 43
CP 036   12   10   R1     D 01334   F 01259   T 41 52        000   02   06   R3 W   D 01096   F 01023   T 79 31
CP 037   12   10   R1     D 01613   F 01543   T 42 38        000   10   06   R1     D 01248   F 01181   T 80 03
CP 038   12   10   R1     D 02045   F 01971   T 44 13     TD 015   10   06   R1     D 01332   F 01264   T 80 11
CP 039   12   10   R1     D 02296   F 02222   T 45 05        000   10   06   R1 D   D 01379   F 01311   T 80 15
CP 040   12   10   R1     D 02590   F 02515   T 46 14        000   10   06   R1     D 01384   F 01317   T 80 16
TR 018   12   10   R1     D 02899   F 02828   T 47 13     CP 076   10   06   R1     D 01453   F 01391   T 80 22
   000   14   08   R1     D 02965   F 02886   T 47 20     TR 032   10   06   R1     D 01562   F 01493   T 80 33
   000   14   08   R1 D   D 02971   F 02893   T 47 21     DO 095   42   36   R2 E   D 01365   F 21945   T 86 29
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George W Green
1-14-77
B. Klein
1/19/77

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.L FRUMP.LDA

.ST 14156

RUN 011  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 13  HOUR 13  MIN 10

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
    000     00     00     R1 D    O 00000    F 00001    T 00 00
    000     00     00     R1      O 00000    F 00001    T 00 01
 TA 001     00     00     R1      O 00012    F 00014    T 00 16
 TA 002     00     00     R1      O 00081    F 00082    T 00 28
    000     17     13     R1      O 00128    F 00128    T 00 35
 CP 001     17     13     R1 D    O 00140    F 00140    T 00 36
    000     17     13     R1      O 00144    F 00144    T 00 37
 TD 001     17     13     R1      O 00229    F 00229    T 00 55
    000     17     13     R1 D    O 00260    F 00260    T 00 58
    000     17     13     R1      O 00266    F 00266    T 00 58
    000     17     13     R1 D    O 00300    F 00300    T 01 01
    000     17     13     R1      O 00305    F 00305    T 01 02
    000     17     13     R1 D    O 00321    F 00321    T 01 03
    000     17     13     R1      O 00326    F 00326    T 01 04
 TA 003     17     13     R1      O 00476    F 00476    T 01 56
 CP 002     17     13     R1      O 00763    F 00764    T 02 44
 CP 003     17     13     R1      O 01146    F 01145    T 03 23
    000     14     06     R1      O 01758    F 01757    T 04 12
    000     14     06     R1 D    O 01769    F 01767    T 04 13
 CP 004     14     06     R1      O 01773    F 01772    T 04 13
    000     14     06     R1 D    O 01898    F 01896    T 04 32
    000     14     06     R1      O 01901    F 01899    T 04 33
 TD 002     14     06     R1      O 01904    F 01902    T 04 33
    000     14     06     R1 D    O 01913    F 01912    T 04 35
 TA 004     14     06     R1      O 01915    F 01915    T 04 36
    000     14     06     R1 D    O 01937    F 01937    T 04 39
    000     14     06     R1      O 01941    F 01941    T 04 40
    000     14     06     R1 D    O 01960    F 01961    T 04 42
    000     14     06     R1      O 01966    F 01966    T 04 42
 CP 005     14     06     R1      O 02167    F 02167    T 05 43
 CP 006     14     06     R1      O 02391    F 02393    T 06 32
 CP 007     14     06     R1      O 02603    F 02604    T 08 13
 CP 008     14     06     R1      O 02887    F 02887    T 08 41
    000     14     08     R3 W    O 03369    F 03369    T 09 54
 CP 009     14     08     R3 W    O 03542    F 03542    T 10 12
 CP 010     14     08     R3 W    O 03880    F 03880    T 10 40
 CP 011     14     08     R3 W    O 00005    F 04100    T 12 34
    000     15     13     R1      O 00285    F 04380    T 13 55
    000     15     13     R1 D    O 00310    F 04405    T 13 57
    000     15     13     R1      O 00315    F 04410    T 13 58
    000     15     13     R1 D    O 00340    F 04435    T 14 00
    000     15     13     R1      O 00345    F 04440    T 14 01
 DO 003     15     13     R1      O 00391    F 04486    T 14 15
 DC 003     15     13     R1      O 00391    F 04486    T 14 40
 TD 003     15     13     R1      O 00421    F 04516    T 14 45
    000     15     13     R1 D    O 00442    F 04537    T 14 47
    000     15     13     R1      O 00448    F 04543    T 14 48
    000     15     13     R1 D    O 00496    F 04591    T 14 51
    000     15     13     R1      O 00503    F 04598    T 14 52
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1-14-77 B. Klein

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.L FRUMP.LDA

.ST 14156

RUN 012  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 13  HOUR.15  MIN 00

FIFTH WHEEL FEET/PULSE  0002    ODOMETER FEET/PULSE  0002
TA 001     00     00     R1       O 00009    F 00010    T 00 29
TA 002     00     00     R1       O 00079    F 00080    T 00 40
   000     17     13     R1       O 00112    F 00112    T 00 45
   000     17     13     R1 D     O 00121    F 00121    T 00 46
   000     17     13     R1       O 00126    F 00126    T 00 46
CP 001     17     13     R1 D     O 00136    F 00136    T 00 47
   000     17     13     R1       O 00141    F 00141    T 00 48
TD 001     17     13     R1       O 00225    F 00225    T 00 56
   000     17     13     R1 D     O 00262    F 00262    T 01 00
   000     17     13     R1       O 00267    F 00267    T 01 00
   000     17     13     R1 D     O 00273    F 00272    T 01 01
   000     17     13     R1       O 00279    F 00278    T 01 01
   000     17     13     R1 D     O 00320    F 00320    T 01 05
   000     17     13     R1       O 00326    F 00326    T 01 05
TA 003     17     13     R1       O 00469    F 00471    T 01 51
CP 002     17     13     R1       O 00759    F 00763    T 02 33
CP 003     17     13     R1       O 01129    F 01135    T 03 22
   000     14     06     R1       O 01743    F 01751    T 04 57
   000     14     06     R1 D     O 01756    F 01764    T 04 58
CP 004     14     06     R1       O 01762    F 01770    T 04 58
TD 002     14     06     R1       O 01888    F 01897    T 05 30
TA 004     14     06     R1 D     O 01901    F 01911    T 05 33
   000     14     06     R1       O 01903    F 01914    T 05 33
   000     14     06     R1 D     O 01946    F 01958    T 05 39
   000     14     06     R1       O 01952    F 01963    T 05 40
CP 005     14     06     R1       O 02149    F 02162    T 06 37
CP 006     14     06     R1       O 02378    F 02390    T 07 03
CP 007     14     06     R1       O 02589    F 02603    T 07 57
CP 008     14     06     R1       O 02867    F 02880    T 08 33
   000     14     06     R2 E     O 03356    F 03370    T 09 53
CP 009     14     06     R2 E     O 03522    F 03538    T 10 08
CP 010     14     06     R2 E     O 03863    F 03881    T 11 11
CP 011     14     06     R2 E     O 04077    F 04095    T 11 34
   000     15     13     R1       O 00265    F 04379    T 12 06
   000     15     13     R1 D     O 00291    F 04405    T 12 26
   000     15     13     R1       O 00292    F 04407    T 12 27
DO 003     15     13     R1       O 00370    F 04485    T 12 44
DC 003     15     13     R1       O 00370    F 04485    T 13 22
TD 003     15     13     R1       O 00390    F 04505    T 13 26
   000     15     13     R1 D     O 00424    F 04538    T 13 29
   000     15     13     R1       O 00430    F 04545    T 13 30
   000     15     13     R1 D     O 00479    F 04594    T 13 33
   000     15     13     R1       O 00487    F 04602    T 13 34
CP 012     15     13     R1       O 00796    F 04912    T 14 35
TA 005     15     13     R1       O 00867    F 04982    T 15 31
CP 013     15     13     R1       O 01086    F 05201    T 16 54
CP 014     15     13     R1       O 01309    F 05425    T 17 24
CP 015     15     13     R1       O 01532    F 05649    T 17 41
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George W. [illegible]
1-14-77
B. Klein
1/14/77

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.L FRUMP.LDA

.ST 14156

RUN 013  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 13  HOUR 16  MIN 50

FIFTH WHEEL FEET/PULSE  0002    ODOMETER FEET/PULSE  0002
TA 001      00      00      R1       O 00107     F 00108     T 00 43
TA 002      00      00      R1       O 00176     F 00178     T 00 52
   000      17      13      R1       O 00212     F 00212     T 00 57
   000      17      13      R1  D    O 00215     F 00215     T 00 58
   000      17      13      R1       O 00219     F 00219     T 00 58
   000      17      13      R1  D    O 00226     F 00226     T 00 59
   000      17      13      R1       O 00230     F 00230     T 01 00
   000      17      13      R1  D    O 00241     F 00241     T 01 01
CP 001      17      13      R1       O 00245     F 00245     T 01 02
TD 001      17      13      R1       O 00321     F 00322     T 01 29
   000      17      13      R1  D    O 00362     F 00363     T 01 33
   000      17      13      R1       O 00368     F 00369     T 01 34
   000      17      13      R1  D    O 00401     F 00402     T 01 36
   000      17      13      R1       O 00408     F 00409     T 01 37
   000      17      13      R1  D    O 00421     F 00422     T 01 38
   000      17      13      R1       O 00429     F 00429     T 01 38
TA 003      17      13      R1       O 00573     F 00575     T 01 51
CP 002      17      13      R1       O 00863     F 00866     T 02 21
CP 003      17      13      R1       O 01234     F 01238     T 03 55
   000      14      06      R1       O 01832     F 01836     T 05 44
   000      14      06      R1  D    O 01857     F 01861     T 05 47
CP 004      14      06      R1       O 01862     F 01865     T 05 47
DO 002      14      06      R1       O 01987     F 01991     T 06 01
   000      14      06      R1  D    O 01987     F 01991     T 06 08
DC 002      14      06      R1       O 01987     F 01991     T 06 08
TD 002      14      06      R1       O 01992     F 01996     T 06 10
   000      14      06      R1  D    O 02006     F 02011     T 06 13
TA 004      14      06      R1       O 02008     F 02014     T 06 14
   000      14      06      R1  D    O 02029     F 02035     T 06 17
   000      14      06      R1       O 02033     F 02039     T 06 17
   000      14      06      R1  D    O 02052     F 02058     T 06 19
   000      14      06      R1       O 02057     F 02063     T 06 20
CP 005      14      06      R1       O 02260     F 02266     T 06 36
CP 006      14      06      R1       O 02485     F 02492     T 07 02
CP 007      14      06      R1       O 02693     F 02699     T 07 48
CP 008      14      06      R1       O 02974     F 02981     T 08 13
CP 009      14      06      R1       O 03630     F 03638     T 11 43
CP 010      14      06      R1       O 03973     F 03981     T 12 15
CP 011      14      06      R1       O 00093     F 04196     T 13 29
   000      15      13      R1       O 00370     F 04473     T 14 01
TD 003      15      13      R1       O 00504     F 04608     T 14 30
   000      15      13      R1  D    O 00517     F 04620     T 14 31
   000      15      13      R1       O 00523     F 04626     T 14 32
   000      15      13      R1  D    O 00535     F 04639     T 14 33
   000      15      13      R1       O 00542     F 04645     T 14 33
   000      15      13      R1  D    O 00590     F 04693     T 14 37
   000      15      13      R1       O 00596     F 04700     T 14 37
CP 012      15      13      R1       O 00902     F 05006     T 15 18
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.ST 14156

RUN 014   SAMPLE RATE 00.5   YEAR 77   MONTH 01   DAY 13   HOUR 20   MIN 25

FIFTH WHEEL FEET/PULSE   0002    ODOMETER FEET/PULSE   0002
   000      00      00      R1  D    O 00000    F 00000    T 00 00
   000      00      00      R1       O 00000    F 00000    T 00 01
TA 001      00      00      R1       O 00008    F 00009    T 00 20
TA 002      00      00      R1       O 00084    F 00084    T 00 31
   000      17      13      R1       O 00104    F 00102    T 00 34
   000      17      13      R1  D    O 00119    F 00117    T 00 36
   000      17      13      R1       O 00123    F 00121    T 00 37
   000      17      13      R1  D    O 00132    F 00130    T 00 38
   000      17      13      R1       O 00135    F 00132    T 00 39
CP 001      17      13      R1       O 00140    F 00139    T 00 40
TD 001      17      13      R1       O 00227    F 00225    T 01 05
   000      17      13      R1  D    O 00259    F 00257    T 01 08
   000      17      13      R1       O 00264    F 00262    T 01 09
   000      17      13      R1  D    O 00279    F 00277    T 01 10
   000      17      13      R1       O 00284    F 00282    T 01 11
   000      17      13      R1  D    O 00301    F 00299    T 01 12
   000      17      13      R1       O 00306    F 00304    T 01 13
   000      17      13      R1  D    O 00325    F 00323    T 01 14
   000      17      13      R1       O 00331    F 00329    T 01 15
TA 003      17      13      R1       O 00475    F 00474    T 01 57
CP 002      17      13      R1       O 00768    F 00767    T 02 46
CP 003      17      13      R1       O 01144    F 01141    T 03 25
   000      14      06      R1       O 01746    F 01742    T 05 06
CP 004      14      06      R1  D    O 01773    F 01769    T 05 08
   000      14      06      R1       O 01779    F 01775    T 05 08
DO 002      14      06      R1       O 01867    F 01863    T 05 25
DC 002      14      06      R1       O 01867    F 01863    T 05 29
TD 002      14      06      R1       O 01901    F 01897    T 05 36
TA 004      14      06      R1  D    O 01915    F 01912    T 05 38
   000      14      06      R1       O 01918    F 01915    T 05 39
   000      14      06      R1  D    O 01937    F 01935    T 05 42
   000      14      06      R1       O 01940    F 01938    T 05 42
CP 005      14      06      R1       O 02168    F 02165    T 06 00
CP 006      14      06      R1       O 02396    F 02392    T 06 18
CP 007      14      06      R1       O 02607    F 02603    T 07 06
CP 008      14      06      R1       O 02881    F 02876    T 07 30
   000      14      08      R2  W    O 03374    F 03369    T 08 58
CP 009      14      08      R2  W    O 03546    F 03540    T 09 11
CP 010      14      08      R2  W    O 03895    F 03890    T 09 37
CP 011      14      08      R2  W    O 00012    F 04104    T 09 52
   000      15      13      R1       O 00292    F 04383    T 10 17
DO 003      15      13      R1       O 00396    F 04487    T 10 30
DC 003      15      13      R1       O 00396    F 04487    T 10 39
TD 003      15      13      R1       O 00417    F 04508    T 10 43
   000      15      13      R1  D    O 00494    F 04586    T 10 48
   000      15      13      R1       O 00502    F 04594    T 10 49
CP 012      15      13      R1       O 00826    F 04918    T 11 17
TA 005      15      13      R1       O 00892    F 04983    T 11 24
CP 013      15      13      R1       O 01113    F 05203    T 11 42
CP 014      15      13      R1       O 01339    F 05428    T 12 09
CP 015      15      13      R1       O 01563    F 05653    T 12 26
CP 016      15      13      R1       O 01787    F 05877    T 12 43
TA 006      15      13      R1       O 01952    F 06041    T 12 58
CP 017      15      13      R1       O 02455    F 06543    T 13 32
CP 018      15      13      R1       O 02513    F 06602    T 13 44
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George W

1-14-77

B. Kl

George
1-14-77
B. Klein
1/14/77

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.L FRUMP.LDA

.ST 14156

RUN 015  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 13  HOUR 22  MIN 00

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
    000     00     00     R1  D    O 00002    F 00002    T 00 00
    000     00     00     R1       O 00002    F 00002    T 00 01
TA  001     00     00     R1       O 00013    F 00014    T 00 09
TA  002     00     00     R1       O 00079    F 00079    T 00 18
    000     17     13     R1       O 00115    F 00114    T 00 22
    000     17     13     R1  D    O 00137    F 00136    T 00 24
CP  001     17     13     R1       O 00143    F 00143    T 00 25
TD  001     17     13     R1       O 00225    F 00224    T 00 31
    000     17     13     R1  D    O 00265    F 00264    T 00 34
    000     17     13     R1       O 00272    F 00271    T 00 34
    000     17     13     R1  D    O 00315    F 00314    T 00 37
    000     17     13     R1       O 00322    F 00322    T 00 38
TA  003     17     13     R1       O 00474    F 00475    T 01 23
CP  002     17     13     R1       O 00764    F 00766    T 02 12
CP  003     17     13     R1       O 01142    F 01143    T 02 51
    000     14     06     R1       O 01739    F 01742    T 03 36
CP  004     14     06     R1  D    O 01769    F 01771    T 03 38
    000     14     06     R1       O 01776    F 01778    T 03 39
DO  002     14     06     R1       O 01871    F 01874    T 03 50
DC  002     14     06     R1       O 01874    F 01876    T 03 52
TD  002     14     06     R1       O 01897    F 01900    T 03 56
TA  004     14     06     R1  D    O 01910    F 01914    T 03 59
    000     14     06     R1       O 01913    F 01917    T 03 59
    000     14     06     R1  D    O 01927    F 01932    T 04 02
    000     14     06     R1       O 01931    F 01936    T 04 02
    000     14     06     R1  D    O 01957    F 01961    T 04 05
    000     14     06     R1       O 01962    F 01967    T 04 06
CP  005     14     06     R1       O 02163    F 02168    T 04 21
CP  006     14     06     R1       O 02397    F 02403    T 04 41
CP  007     14     06     R1       O 02596    F 02602    T 05 29
CP  008     14     06     R1       O 02882    F 02888    T 05 54
    000     14     08     R2  W    O 03360    F 03368    T 07 12
CP  009     14     08     R2  W    O 03538    F 03546    T 07 25
CP  010     14     08     R2  W    O 03876    F 03884    T 07 52
CP  011     14     08     R2  W    O 04095    F 04104    T 08 07
    000     15     13     R1       O 00282    F 04388    T 08 54
TD  003     15     13     R1       O 00406    F 04512    T 09 04
    000     15     13     R1  D    O 00436    F 04542    T 09 07
    000     15     13     R1       O 00442    F 04548    T 09 07
    000     15     13     R1  D    O 00483    F 04589    T 09 10
    000     15     13     R1       O 00491    F 04597    T 09 11
CP  012     15     13     R1       O 00810    F 04917    T 09 38
TA  005     15     13     R1       O 00882    F 04988    T 09 47
CP  013     15     13     R1       O 01098    F 05204    T 11 06
CP  014     15     13     R1       O 01321    F 05426    T 11 37
CP  015     15     13     R1       O 01545    F 05652    T 11 56
CP  016     15     13     R1       O 01767    F 05875    T 12 11
TA  006     15     13     R1       O 01935    F 06042    T 12 25
CP  017     15     13     R1       O 02435    F 06543    T 12 58
CP  018     15     13     R1       O 02492    F 06600    T 13 11
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.L FRUMP.

.ST 14156

RUN 016 .SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 13  HOUR 23  MIN 2

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001     00     00     R1       O 00010    F 00011    T 00 11
TA 002     00     00     R1       O 00079    F 00080    T 00 20
   000     17     13     R1       O 00117    F 00116    T 00 24
   000     17     13     R1  D    O 00138    F 00136    T 00 26
CP 001     17     13     R1       O 00143    F 00141    T 00 27
DO 001     17     13     R1       O 00189    F 00188    T 00 35
DC 001     17     13     R1       O 00189    F 00188    T 00 40
TD 001     17     13     R1       O 00223    F 00222    T 00 46
   000     17     13     R1  D    O 00273    F 00271    T 00 50
   000     17     13     R1       O 00279    F 00278    T 00 51
   000     17     13     R1  D    O 00306    F 00305    T 00 53
   000     17     13     R1       O 00313    F 00311    T 00 53
   000     17     13     R1  D    O 00327    F 00325    T 00 54
   000     17     13     R1       O 00333    F 00332    T 00 55
TA 003     17     13     R1       O 00477    F 00477    T 01 07
CP 002     17     13     R1       O 00764    F 00765    T 01 34
CP 003     17     13     R1       O 01138    F 01138    T 02 08
   000     14     06     R1       O 01753    F 01753    T 02 59
   000     14     06     R1  D    O 01760    F 01760    T 03 00
CP 004     14     06     R1       O 01766    F 01766    T 03 00
TD 002     14     06     R1       O 01897    F 01897    T 03 14
TA 004     14     06     R1       O 01909    F 01910    T 03 17
   000     14     06     R1  D    O 01912    F 01913    T 03 17
   000     14     06     R1       O 01914    F 01915    T 03 18
CP 005     14     06     R1       O 02165    F 02166    T 03 38
CP 006     14     06     R1       O 02391    F 02393    T 03 59
CP 007     14     06     R1       O 02602    F 02604    T 04 56
CP 008     14     06     R1       O 02882    F 02884    T 05 20
   000     14     08     R3  W    O 03361    F 03363    T 06 33
CP 009     14     08     R3  W    O 03539    F 03541    T 06 48
CP 010     14     08     R3  W    O 03889    F 03892    T 07 14
CP 011     14     08     R3  W    O 00002    F 04101    T 07 28
   000     15     13     R1       O 00290    F 04389    T 07 53
DO 003     15     13     R1       O 00376    F 04475    T 08 03
DC 003     15     13     R1       O 00376    F 04475    T 08 11
TD 003     15     13     R1       O 00409    F 04509    T 08 16
   000     15     13     R1  D    O 00429    F 04529    T 08 17
   000     15     13     R1       O 00436    F 04535    T 08 18
   000     15     13     R1  D    O 00443    F 04543    T 08 18
   000     15     13     R1       O 00450    F 04550    T 08 19
   000     15     13     R1  D    O 00496    F 04596    T 08 22
   000     15     13     R1       O 00504    F 04604    T 08 22
CP 012     15     13     R1       O 00818    F 04918    T 08 49
TA 005     15     13     R1       O 00889    F 04988    T 09 00
CP 013     15     13     R1       O 01106    F 05203    T 09 26
CP 014     15     13     R1       O 01329    F 05428    T 09 52
CP 015     15     13     R1       O 01567    F 05666    T 10 11
CP 016     15     13     R1       O 01775    F 05874    T 10 25
TA 006     15     13     R1       O 01943    F 06042    T 10 38
CP 017     15     13     R1       O 02445    F 06544    T 11 10
CP 018     15     13     R1       O 02501    F 06600    T 11 21
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1-14

B. Klein

2x

B. Klein 1/18/77

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.L FRUMP.LDA

.ST 14156

RUN 017  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 14  HOUR 03  MIN 50

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
   000      00      00      R1  D    O 00001     F 00000    T 00 00
   000      00      00      R1       O 00001     F 00000    T 00 01
TA 001      00      00      R1       O 00024     F 00025    T 00 16
TA 002      00      00      R1       O 00095     F 00095    T 00 24
CP 001      00      00      R1       O 00154     F 00153    T 00 30
   000      17      13      R1       O 00166     F 00166    T 00 31
TD 001      17      13      R1       O 00236     F 00235    T 00 36
   000      17      13      R1  D    O 00278     F 00277    T 00 39
   000      17      13      R1       O 00285     F 00284    T 00 40
   000      17      13      R1  D    O 00299     F 00299    T 00 41
   000      17      13      R1       O 00307     F 00306    T 00 41
   000      17      13      R1  D    O 00314     F 00314    T 00 42
   000      17      13      R1       O 00322     F 00321    T 00 42
   000      17      13      R1  D    O 00338     F 00337    T 00 43
   000      17      13      R1       O 00346     F 00345    T 00 44
TA 003      17      13      R1       O 00491     F 00491    T 00 55
CP 002      17      13      R1       O 00776     F 00779    T 01 23
CP 003      17      13      R1       O 01153     F 01155    T 02 00
   000      14      06      R1       O 01765     F 01766    T 03 37
CP 004      14      06      R1  D    O 01779     F 01781    T 03 38
   000      14      06      R1       O 01786     F 01788    T 03 39
DO 002      14      06      R1       O 01858     F 01860    T 03 51
DC 002      14      06      R1       O 01859     F 01861    T 03 58
   000      14      06      R1  D    O 01905     F 01907    T 04 06
TD 002      14      06      R1       O 01908     F 01911    T 04 06
TA 004      14      06      R1       O 01924     F 01928    T 04 09
   000      14      06      R1  D    O 01928     F 01932    T 04 09
   000      14      06      R1       O 01931     F 01936    T 04 10
   000      14      06      R1  D    O 01974     F 01979    T 04 14
   000      14      06      R1       O 01981     F 01986    T 04 14
CP 005      14      06      R1       O 02178     F 02183    T 04 32
CP 006      14      06      R1       O 02402     F 02407    T 04 55
CP 007      14      06      R1       O 02614     F 02620    T 05 46
   000      10      06      R3  N    O 02620     F 02625    T 05 46
CP 008      10      06      R3  N    O 02893     F 02898    T 06 14
CP 009      10      06      R3  N    O 03547     F 03553    T 07 40
CP 010      10      06      R3  N    O 03889     F 03896    T 08 08
CP 011      10      06      R3  N    O 00009     F 04111    T 08 39
   000      15      13      R1       O 00298     F 04400    T 09 11
   000      15      13      R1  D    O 00317     F 04419    T 09 13
   000      15      13      R1       O 00321     F 04423    T 09 14
DO 003      15      13      R1       O 00356     F 04458    T 09 22
DC 003      15      13      R1       O 00371     F 04475    T 10 56
TD 003      15      13      R1  D    O 00424     F 04528    T 11 03
   000      15      13      R1       O 00430     F 04533    T 11 04
   000      15      13      R1  D    O 00452     F 04555    T 11 06
   000      15      13      R1       O 00457     F 04561    T 11 06
   000      15      13      R1  D    O 00503     F 04607    T 11 11
   000      15      13      R1       O 00508     F 04612    T 11 11
CP 012      15      13      R1       O 00823     F 04927    T 11 44
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B. Klein 1/18

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.L FRUMP.LDA

.DT 14156

RUN 018  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 14  HOUR`10  MIN 20

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001    00    00    R1      O 00009    F 00009    T 00 17
TA 002    00    00    R1      O 00031    F 00032    T 00 30
   000    17    13    R1      O 00134    F 00133    T 00 37
   000    17    13    R1  D   O 00145    F 00144    T 00 38
CP 001    17    13    R1      O 00151    F 00150    T 00 38
TD 001    17    13    R1      O 00225    F 00225    T 00 47
   000    17    13    R1  D   O 00261    F 00260    T 00 50
   000    17    13    R1      O 00267    F 00266    T 00 51
   000    17    13    R1  D   O 00314    F 00314    T 00 55
   000    17    13    R1      O 00317    F 00317    T 00 56
   000    17    13    R1  D   O 00325    F 00324    T 00 57
   000    17    13    R1      O 00327    F 00327    T 00 58
TA 003    17    13    R1      O 00478    F 00479    T 01 44
CP 002    17    13    R1      O 00762    F 00766    T 02 41
CP 003    17    13    R1      O 01142    F 01145    T 03 17
   000    14    06    R1      O 01734    F 01737    T 04 58
   000    14    06    R1  D   O 01745    F 01748    T 05 00
   000    14    06    R1      O 01748    F 01751    T 05 00
   000    14    06    R1  D   O 01762    F 01765    T 05 02
CP 004    14    06    R1      O 01765    F 01768    T 05 03
TD 002    14    06    R1      O 01897    F 01901    T 05 28
TA 004    14    06    R1      O 01907    F 01912    T 05 30
   000    14    06    R1  D   O 01910    F 01915    T 05 31
   000    14    06    R1      O 01913    F 01918    T 05 31
   000    14    06    R1  D   O 01932    F 01938    T 05 34
   000    14    06    R1      O 01937    F 01944    T 05 34
CP 005    14    06    R1      O 02158    F 02166    T 06 37
CP 006    14    06    R1      O 02383    F 02392    T 07 03
CP 007    14    06    R1      O 02595    F 02604    T 07 58
CP 008    14    06    R1      O 02878    F 02888    T 08 25
   000    14    08    R3  W   O 03362    F 03374    T 10 03
CP 009    14    08    R3  W   O 03523    F 03541    T 10 50
CP 010    14    08    R3  W   O 03869    F 03884    T 12 23
CP 011    14    08    R3  W   O 04088    F 04103    T 12 40
   000    15    13    R1      O 00275    F 04336    T 13 51
DD 003    15    13    R1      O 00367    F 04479    T 14 05
DC 004    15    13    R1      O 00367    F 04479    T 14 26
TD 003    15    13    R1      O 00392    F 04504    T 14 34
   000    15    13    R1  D   O 00448    F 04560    T 14 38
   000    15    13    R1      O 00455    F 04567    T 14 39
   000    15    13    R1  D   O 00476    F 04588    T 14 40
   000    15    13    R1      O 00483    F 04595    T 14 41
CP 012    15    13    R1      O 00805    F 04920    T 15 10
TA 005    15    13    R1      O 00870    F 04983    T 15 21
CP 013    15    13    R1      O 01090    F 05204    T 16 48
CP 014    15    13    R1      O 01314    F 05428    T 17 18
CP 015    15    13    R1      O 01537    F 05653    T 18 46
CP 016    15    13    R1      O 01766    F 05883    T 19 19
TA 006    15    13    R1      O 01929    F 06044    T 20 08
```

Should be DC3

BAD/DELETED DATA

B. Klein 1/18/

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.L FRUMP.LDA

.ST 14156

RUN 019  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 14  HOUR 13  MIN 30

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
   000     00     12     R1      O 00810    F 00240    T 00 17
   000     00     14     R1      O 00840    F 00240    T 00 17
   000     00     17     R1      O 00870    F 00240    T 00 17
   000     00     19     R1      O 00900    F 00240    T 00 17
   000     00     22     R1      O 00930    F 00240    T 00 17
   000     00     24     R1      O 00960    F 00240    T 00 17
   000     00     27     R1      O 00990    F 00240    T 00 17
   000     00     30     R1      O 01020    F 00240    T 00 17
   000     00     33     R1      O 00026    F 00240    T 00 17
   000     00     36     R1      O 00056    F 00240    T 00 17
   000     00     39     R1      O 00086    F 00240    T 00 17
   000     00     42     R1      O 00116    F 00240    T 00 17
   000     00     44     R3 S    O 00146    F 00000    T 00 17
   000     00     00     R1      O 00000    F 00046    T 00 17
   000     96     81     R1      O 00078    F 00752    T 00 42
   000     00     84     R1      O 00566    F 00240    T 00 52
   000     00     87     R1      O 00596    F 00240    T 00 52
   000     00     90     R1      O 00626    F 00240    T 00 52
   000     00     93     R1      O 00656    F 00240    T 00 52
   000     00     96     R1      O 00686    F 00240    T 00 52
   000     00     99     R1      O 00716    F 00240    T 00 52
   000     00     03     R1      O 00746    F 00240    T 00 52
   000     00     06     R1      O 00776    F 00240    T 00 52
   000     00     10     R1      O 00806    F 00240    T 00 52
   000     00     13     R1      O 00836    F 00240    T 00 52
   008     00     17     R2 N    O 00866    F 00240    T 00 53
   008     00     20     R2 N    O 00896    F 00240    T 00 53
   008     00     24     R2 N    O 00926    F 00240    T 00 53
   008     00     27     R2 N    O 00956    F 00240    T 00 53
   008     01     03     R2 N    O 00986    F 00243    T 00 53
   008     01     06     R2 N    O 01016    F 00240    T 00 53
   008     01     09     R2 N    O 00022    F 00240    T 00 53
   008     01     11     R2 N    O 00052    F 00243    T 00 53
   008     01     13     R2 N    O 00082    F 00240    T 00 53
   008     33     16     R2 N    O 00112    F 28656    T 00 53
   008     01     18     R2 N    O 00142    F 00240    T 00 53
   008     01     19     R2 N    O 00172    F 00240    T 00 53
   008     01     21     R2 N    O 00202    F 00240    T 00 53
   008     01     23     R2 N    O 00232    F 00240    T 00 53
   008     01     25     R2 N    O 00262    F 00240    T 00 53
   008     01     26     R2 N    O 00292    F 00240    T 00 53
   008     01     28     R2 N    O 00322    F 00240    T 00 53
   008     01     30     R2 N    O 00352    F 00240    T 00 53
   008     01     31     R2 N    O 00382    F 00240    T 00 53
   008     01     32     R2 N    O 00412    F 00240    T 00 53
   008     01     34     R2 N    O 00442    F 00240    T 00 53
   008     01     35     R2 N    O 00502    F 00240    T 01 10
   000     20     01     R1      O 00000    F 00162    T 01 59
   000     17     13     R1      O 00163    F 00162    T 02 10
   008     01     35     R2 N    O 00018    F 00240    T 02 19
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.L FRUMP.LDA

.ST 14156
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B. Kliem 1/18/77

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RUN 020  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 14  HOUR 16  MIN 00

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001    00    00    R1     O 00008    F 00010    T 00 10
TA 002    00    00    R1     O 00079    F 00079    T 00 22
   000    17    13    R1     O 00099    F 00098    T 00 25
   000    17    13    R1  D  O 00103    F 00102    T 00 26
   000    17    13    R1     O 00107    F 00106    T 00 26
   000    17    13    R1  D  O 00115    F 00113    T 00 27
   000    17    13    R1     O 00119    F 00117    T 00 28
   000    17    13    R1  D  O 00126    F 00124    T 00 29
   000    17    13    R1     O 00129    F 00127    T 00 29
CP 001    17    13    R1     O 00139    F 00137    T 00 32
TD 001    17    13    R1     O 00224    F 00222    T 00 59
   000    17    13    R1  D  O 00261    F 00259    T 01 03
   000    17    13    R1     O 00267    F 00264    T 01 03
   000    17    13    R1  D  O 00284    F 00282    T 01 05
   000    17    13    R1     O 00290    F 00287    T 01 05
   000    17    13    R1  D  O 00314    F 00311    T 01 07
   000    17    13    R1     O 00320    F 00317    T 01 08
TA 003    17    13    R1     O 00473    F 00471    T 01 55
   000    17    12    R3  E  O 00476    F 00473    T 01 56
CP 002    17    12    R3  E  O 00767    F 00764    T 02 41
CP 003    17    12    R3  E  O 01143    F 01139    T 04 08
   000    14    06    R1     O 01758    F 01751    T 05 55
   000    14    06    R1  D  O 01770    F 01763    T 05 56
CP 004    14    06    R1     O 01775    F 01769    T 05 57
TD 002    14    06    R1     O 01905    F 01898    T 06 16
TA 004    14    06    R1     O 01916    F 01909    T 06 18
   000    14    06    R1  D  O 01922    F 01916    T 06 19
   000    14    06    R1     O 01925    F 01919    T 06 19
   000    14    06    R1  D  O 01943    F 01938    T 06 22
   000    14    06    R1     O 01947    F 01942    T 06 22
   000    14    06    R1  D  O 01961    F 01956    T 06 24
   000    14    06    R1     O 01966    F 01960    T 06 24
CP 005    14    06    R1     O 02166    F 02159    T 07 40
CP 006    14    06    R1     O 02398    F 02390    T 08 16
CP 007    14    06    R1     O 02605    F 02597    T 10 04
   000    10    06    R3  N  O 02613    F 02604    T 10 05
CP 008    10    06    R3  N  O 02887    F 02878    T 12 10
CP 009    10    06    R3  N  O 03540    F 03529    T 18 01
CP 010    10    06    R3  N  O 03885    F 03871    T 19 15
CP 011    10    06    R3  N  O 00001    F 04081    T 20 05
   000    15    13    R1     O 00273    F 04352    T 22 34
   000    15    13    R1  D  O 00276    F 04355    T 22 37
   000    15    13    R1     O 00277    F 04355    T 22 37
   000    15    13    R1  D  O 00282    F 04360    T 23 01
   000    15    13    R1     O 00282    F 04360    T 23 01
   000    15    13    R1  D  O 00282    F 04360    T 23 04
   000    15    13    R1     O 00282    F 04360    T 23 05
DO 003    15    13    R1     O 00394    F 04475    T 24 54
DC 003    15    13    R1     O 00394    F 04475    T 25 14
TD 003    15    13    R1     O 00414    F 04495    T 25 20
   000    15    13    R1  D  O 00447    F 04526    T 25 25
   000    15    13    R1     O 00450    F 04530    T 25 25
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1/18/77 B. Kliem

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.L FRUMP.LDA

.ST 14156

RUN 021  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 14  HOUR 13  MIN 00

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001      00      00      R1       O 00002    F 00002   T 00 05
TA 002      00      00      R1       O 00079    F 00079   T 00 13
   000      17      13      R1       O 00107    F 00105   T 00 22
   000      17      13      R1  D    O 00111    F 00109   T 00 22
   000      17      13      R1       O 00115    F 00112   T 00 23
   000      17      13      R1  D    O 00128    F 00124   T 00 24
   000      17      13      R1       O 00132    F 00128   T 00 25
CP 001      17      13      R1       O 00136    F 00132   T 00 25
TD 001      17      13      R1       O 00213    F 00214   T 00 38
   000      17      13      R1  D    O 00262    F 00257   T 00 42
   000      17      13      R1       O 00268    F 00262   T 00 43
   000      17      13      R1  D    O 00273    F 00267   T 00 43
   000      17      13      R1       O 00278    F 00272   T 00 44
   000      17      13      R1  D    O 00305    F 00299   T 00 46
   000      17      13      R1       O 00311    F 00305   T 00 47
   000      17      13      R1  D    O 00323    F 00316   T 00 48
   000      17      13      R1       O 00328    F 00322   T 00 48
TA 003      17      13      R1       O 00473    F 00466   T 01 19
CP 002      17      13      R1       O 00765    F 00756   T 02 14
CP 003      17      13      R1       O 01145    F 01132   T 02 59
   000      14      06      R1       O 01742    F 01723   T 04 42
   000      14      06      R1  D    O 01752    F 01734   T 04 43
   000      14      06      R1       O 01757    F 01738   T 04 43
CP 004      14      06      R1  D    O 01775    F 01757   T 04 45
   000      14      06      R1       O 01780    F 01761   T 04 46
TD 002      14      06      R1       O 01905    F 01885   T 05 00
TA 004      14      06      R1       O 01914    F 01896   T 05 02
   000      14      06      R1  D    O 01920    F 01901   T 05 03
   000      14      06      R1       O 01922    F 01904   T 05 03
   000      14      06      R1  D    O 01937    F 01919   T 05 06
   000      14      06      R1       O 01940    F 01922   T 05 06
CP 005      14      06      R1       O 02172    F 02153   T 06 17
CP 066      14      06      R1       O 02400    F 02378   T 06 46
CP 007      14      06      R1       O 02553    F 02529   T 07 04
EE 066      14      06      R1       O 02583    F 02559   T 07 11
EE 007      14      06      R1       O 02583    F 02558   T 07 22
CP 007      14      06      R1       O 02603    F 02583   T 07 37
   000      10      06      R3  N    O 02614    F 02590   T 07 38
CP 008      10      06      R3  N    O 02896    F 02869   T 08 13
CP 009      10      06      R3  N    O 03554    F 03521   T 10 52
CP 010      10      06      R3  N    O 03894    F 03859   T 11 55
CP 111      10      06      R3  N    O 00019    F 04078   T 12 16
EE 111      10      06      R3  N    O 00072    F 04131   T 12 29
   000      15      13      R1       O 00303    F 04359   T 13 19
OO 003      15      13      R1       O 00408    F 04465   T 13 34
OC 003      15      13      R1       O 00408    F 04465   T 14 01
TD 003      15      13      R1       O 00430    F 04486   T 14 07
   000      15      13      R1  D    O 00471    F 04526   T 14 12
   000      15      13      R1       O 00474    F 04529   T 14 13
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.L FRUMP.LDA

.ST 14156
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B. Klein 1/18/77

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RUN 022  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 14  HOUR 20  MIN 40

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001      00     00     R1       O 00010    F 00010    T 00 07
TA 002      00     00     R1       O 00073    F 00072    T 00 17
   000      17     13     R1       O 00119    F 00115    T 00 23
   000      17     13     R1  D    O 00132    F 00128    T 00 24
CP 001      17     13     R1       O 00136    F 00131    T 00 25
DO 001      17     13     R1       O 00174    F 00169    T 00 35
DC 001      17     13     R1       O 00174    F 00169    T 00 41
TD 001      17     13     R1       O 00217    F 00211    T 00 50
   000      17     13     R1  D    O 00254    F 00247    T 00 55
   000      17     13     R1       O 00258    F 00251    T 00 56
   000      17     13     R1  D    O 00316    F 00308    T 01 02
   000      17     13     R1       O 00320    F 00312    T 01 03
TA 003      17     13     R1       O 00473    F 00465    T 01 55
CP 002      17     13     R1       O 00765    F 00749    T 02 44
CP 003      17     13     R1       O 01142    F 01113    T 03 27
   000      14     06     R1       O 01744    F 01703    T 05 13
   000      14     06     R1  D    O 01749    F 01708    T 05 14
   000      14     06     R1       O 01754    F 01714    T 05 14
   000      14     06     R1  D    O 01768    F 01727    T 05 16
CP 004      14     06     R1       O 01772    F 01731    T 05 16
TD 002      14     06     R1       O 01905    F 01863    T 05 33
TA 004      14     06     R1  D    O 01917    F 01876    T 05 36
   000      14     06     R1       O 01920    F 01878    T 05 36
   000      14     06     R1  D    O 01939    F 01898    T 05 40
   000      14     06     R1       O 01943    F 01902    T 05 40
CP 005      14     06     R1       O 02180    F 02133    T 06 45
CP 006      14     06     R1       O 02401    F 02351    T 07 11
CP 007      10     06     R3  N    O 02612    F 02560    T 08 05
CP 008      10     06     R3  N    O 02893    F 02837    T 08 33
CP 009      10     06     R3  N    O 03556    F 03493    T 10 14
CP 010      10     06     R3  N    O 03892    F 03827    T 11 17
CP 011      10     06     R3  N    O 00015    F 04043    T 11 39
   000      15     13     R1       O 00295    F 04313    T 12 52
DO 003      15     13     R1       O 00400    F 04421    T 13 05
DC 003      15     13     R1       O 00409    F 04430    T 13 30
TD 003      15     13     R1       O 00434    F 04454    T 13 36
   000      15     13     R1  D    O 00514    F 04532    T 13 44
   000      15     13     R1       O 00520    F 04537    T 13 44
CP 012      15     13     R1       O 00836    F 04846    T 14 15
TA 005      15     13     R1       O 00913    F 04920    T 14 26
CP 013      15     13     R1       O 01129    F 05128    T 15 49
CP 014      15     13     R1       O 01355    F 05350    T 16 19
CP 015      15     13     R1       O 01582    F 05569    T 16 39
CP 016      15     13     R1       O 01813    F 05794    T 16 58
TA 006      15     13     R1       O 01976    F 05953    T 17 14
CP 017      15     13     R1       O 02481    F 06445    T 17 54
CP 018      15     13     R1       O 02540    F 06504    T 18 04
   000      12     06     R1       O 02668    F 06627    T 18 17
   000      12     06     R1  D    O 02724    F 06682    T 18 22
   000      12     06     R1       O 02729    F 06687    T 18 22
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.L FRUMP

.L FRUMP.LDA

.DT 14156
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B. Klein 1/18/77

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RUN 023  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 14  HOUR 22  MIN 00

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001     00     00     R1       O 00006     F 00006    T 00 24
TA 002     00     00     R1       O 00030     F 00077    T 00 36
   000     17     13     R1       O 00105     F 00101    T 00 40
   000     17     13     R1 D     O 00109     F 00104    T 00 41
   000     17     13     R1       O 00113     F 00108    T 00 41
   000     17     13     R1 D     O 00117     F 00112    T 00 42
   000     17     13     R1       O 00121     F 00115    T 00 42
   000     17     13     R1 D     O 00139     F 00132    T 00 44
CP 001     17     13     R1       O 00143     F 00137    T 00 45
DO 001     17     13     R1       O 00194     F 00187    T 00 53
DC 001     17     13     R1       O 00195     F 00188    T 01 03
TD 001     17     13     R1       O 00221     F 00213    T 01 09
   000     17     13     R1 D     O 00264     F 00254    T 01 13
   000     17     13     R1       O 00270     F 00260    T 01 13
   000     17     13     R1 D     O 00306     F 00295    T 01 16
   000     17     13     R1       O 00312     F 00301    T 01 17
   000     17     13     R1 D     O 00330     F 00318    T 01 18
   000     17     13     R1       O 00335     F 00324    T 01 19
TA 003     17     13     R1       O 00476     F 00464    T 02 10
CP 002     17     13     R1       O 00765     F 00747    T 03 01
CP 003     17     13     R1       O 01139     F 01108    T 03 34
   000     14     06     R1       O 01745     F 01707    T 04 27
   000     14     06     R1 D     O 01751     F 01713    T 04 27
   000     14     06     R1       O 01757     F 01719    T 04 28
CP 004     14     06     R1 D     O 01776     F 01737    T 04 29
   000     14     06     R1       O 01792     F 01743    T 04 30
TD 002     14     06     R1       O 01908     F 01867    T 04 42
TA 004     14     06     R1       O 01919     F 01881    T 04 45
   000     14     06     R1 D     O 01922     F 01883    T 04 45
   000     14     06     R1       O 01925     F 01886    T 04 46
   000     14     06     R1 D     O 01943     F 01904    T 04 49
   000     14     06     R1       O 01947     F 01907    T 04 49
CP 005     14     06     R1       O 02174     F 02131    T 05 11
CP 006     14     06     R1       O 02403     F 02358    T 05 33
CP 007     14     06     R1       O 02614     F 02567    T 06 21
   000     10     06     R3 N     O 02621     F 02574    T 06 22
CP 008     10     06     R3 N     O 02996     F 02947    T 07 43
CP 009     10     06     R3 N     O 03558     F 03499    T 09 37
CP 010     10     06     R3 N     O 03901     F 03838    T 10 41
CP 011     10     06     R3 N     O 00022     F 04053    T 11 07
   000     15     13     R1       O 00291     F 04319    T 12 04
   000     15     13     R1 D     O 00367     F 04395    T 12 12
   000     15     13     R1       O 00372     F 04399    T 12 12
DO 003     15     13     R1       O 00409     F 04436    T 12 13
DC 003     15     13     R1       O 00410     F 04437    T 12 50
TD 003     15     13     R1       O 00433     F 04459    T 12 56
   000     15     13     R1 D     O 00478     F 04503    T 13 00
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.L FROMF.LDA

.ST 14156
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1/18/77 B. Kliem

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RUN 024  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 14  HOUR 23  MIN 30

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001     00     00     R1       O 00006    F 00006    T 00 26
TA 002     00     00     R1       O 00074    F 00073    T 00 38
   000     17     13     R1       O 00108    F 00104    T 00 43
   000     17     13     R1  D    O 00131    F 00126    T 00 46
   000     17     13     R1       O 00135    F 00130    T 00 46
CP 001     17     13     R1       O 00139    F 00134    T 00 47
   000     17     13     R1  D    O 00145    F 00141    T 00 48
   000     17     13     R1       O 00149    F 00144    T 00 48
TD 001     17     13     R1       O 00222    F 00215    T 01 10
   000     17     13     R1  D    O 00259    F 00251    T 01 14
   000     17     13     R1       O 00263    F 00256    T 01 15
TA 033     17     13     R1       O 00473    F 00463    T 02 07
EE 033     17     13     R1       O 00509    F 00501    T 02 14
TA 003     17     13     R1       O 00520    F 00511    T 02 16
CP 002     17     13     R1       O 00762    F 00749    T 03 00
CP 003     17     13     R1       O 01139    F 01115    T 04 24
   000     14     06     R1       O 01758    F 01724    T 06 23
   000     14     06     R1  D    O 01771    F 01736    T 06 24
CP 004     14     06     R1       O 01776    F 01741    T 06 25
DO 002     14     06     R1       O 01882    F 01846    T 06 38
DC 002     14     06     R1       O 01886    F 01850    T 06 42
TD 002     14     06     R1       O 01904    F 01868    T 06 47
TA 004     14     06     R1       O 01914    F 01879    T 06 49
   000     14     06     R1  D    O 01925    F 01890    T 06 52
   000     14     06     R1       O 01927    F 01892    T 06 52
CP 005     14     06     R1       O 02171    F 02135    T 08 04
CP 006     14     06     R1       O 02400    F 02362    T 08 42
CP 007     14     06     R1       O 02607    F 02567    T 09 35
   000     10     06     R3  N    O 02619    F 02579    T 09 37
CP 008     10     06     R3  N    O 02895    F 02855    T 10 01
CP 009     10     06     R3  N    O 03556    F 03509    T 11 38
CP 010     10     06     R3  N    O 03896    F 03846    T 12 40
CP 011     10     06     R3  N    O 00022    F 04067    T 13 00
   000     15     13     R1       O 00295    F 04338    T 13 27
DO 003     15     13     R1       O 00405    F 04447    T 13 40
DC 003     15     13     R1       O 00412    F 04454    T 13 49
TD 003     15     13     R1       O 00431    F 04473    T 13 52
   000     15     13     R1  D    O 00520    F 04560    T 14 00
   000     15     13     R1       O 00525    F 04566    T 14 00
CP 012     15     13     R1       O 00838    F 04875    T 14 34
TA 005     15     13     R1       O 00915    F 04950    T 14 45
CP 013     15     13     R1       O 01133    F 05165    T 16 10
CP 014     15     13     R1       O 01358    F 05388    T 16 38
CP 015     15     13     R1       O 01584    F 05609    T 16 59
CP 016     15     13     R1       O 01810    F 05832    T 17 18
TA 006     15     13     R1       O 01979    F 05995    T 17 36
CP 017     15     13     R1       O 02489    F 06491    T 18 16
CP 018     15     13     R1       O 02544    F 06545    T 18 26
   000     12     06     R1       O 02677    F 06675    T 18 39
DO 004     12     06     R1       O 02799    F 06795    T 18 53
DC 004     12     06     R1       O 02800    F 06797    T 19 13
TD 004     12     06     R1       O 02811    F 06807    T 19 18
   000     12     06     R1  D    O 02840    F 06836    T 19 22
   000     12     06     R1       O 02846    F 06842    T 19 22
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B. Klein 1/18/77

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.L FRUMP.LDA

.ST 14156

RUN 025  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 15  HOUR 00  MIN 50

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001     00     00     R1       O 00009    F 00009   T 00 35
TA 002     00     00     R1       O 00086    F 00083   T 00 47
   000     17     13     R1       O 00114    F 00109   T 00 51
   000     17     13     R1  D    O 00137    F 00131   T 00 53
CP 001     17     13     R1       O 00141    F 00135   T 00 54
DO 001     17     13     R1       O 00196    F 00190   T 01 01
DC 001     17     13     R1       O 00198    F 00191   T 01 19
TD 001     17     13     R1       O 00224    F 00217   T 01 28
   000     17     13     R1  D    O 00263    F 00256   T 01 32
   000     17     13     R1       O 00269    F 00261   T 01 33
   000     17     13     R1  D    O 00306    F 00298   T 01 36
   000     17     13     R1       O 00311    F 00303   T 01 37
   000     17     13     R1  D    O 00328    F 00320   T 01 38
   000     17     13     R1       O 00333    F 00325   T 01 39
TA 003     17     13     R1       O 00480    F 00470   T 01 55
CP 002     17     13     R1       O 00769    F 00756   T 02 40
CP 003     17     13     R1       O 01140    F 01124   T 03 08
   000     14     06     R1       O 01751    F 01732   T 04 47
   000     14     06     R1  D    O 01758    F 01739   T 04 48
   000     14     06     R1       O 01764    F 01745   T 04 48
   000     14     06     R1  D    O 01771    F 01752   T 04 49
CP 004     14     06     R1       O 01778    F 01758   T 04 49
TD 002     14     06     R1       O 01906    F 01887   T 05 02
TA 004     14     06     R1       O 01924    F 01905   T 05 05
   000     14     06     R1  D    O 01927    F 01908   T 05 06
   000     14     06     R1       O 01929    F 01911   T 05 06
CP 005     14     06     R1       O 02177    F 02155   T 05 30
CP 006     14     06     R1       O 02401    F 02377   T 05 50
   000     10     06     R3  N    O 02613    F 02589   T 06 40
CP 007     10     06     R3  N    O 02615    F 02591   T 06 40
CP 008     10     06     R3  N    O 02895    F 02870   T 07 12
CP 009     10     06     R3  N    O 03556    F 03527   T 08 48
CP 010     10     06     R3  N    O 03902    F 03872   T 09 53
CP 011     10     06     R3  N    O 00020    F 04085   T 10 12
   000     15     13     R1       O 00302    F 04366   T 10 35
DO 003     15     13     R1       O 00406    F 04468   T 10 46
DC 003     15     13     R1       O 00411    F 04474   T 10 58
TD 003     15     13     R1       O 00432    F 04493   T 11 04
   000     15     13     R1  D    O 00474    F 04536   T 11 08
   000     15     13     R1       O 00480    F 04542   T 11 09
   000     15     13     R1  D    O 00525    F 04587   T 11 12
   000     15     13     R1       O 00532    F 04593   T 11 13
CP 012     15     13     R1       O 00837    F 04897   T 11 40
TA 005     15     13     R1       O 00919    F 04976   T 11 54
CP 013     15     13     R1       O 01132    F 05187   T 13 21
CP 014     15     13     R1       O 01359    F 05412   T 13 52
CP 015     15     13     R1       O 01583    F 05634   T 14 11
CP 016     15     13     R1       O 01808    F 05857   T 14 28
TA 006     15     13     R1       O 01980    F 06026   T 14 44
CP 017     15     13     R1       O 02482    F 06520   T 15 21
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.L FRUMP.LDA

.ST 14156
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B. Klein 1/18/77

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RUN 026  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 15  HOUR 10  MIN 35

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE   0002
TA 001     00     00     R1      O 00000     F 00000    T 00 10
TA 002     00     00     R1      O 00079     F 00078    T 00 29
   000     17     13     R1      O 00097     F 00095    T 00 31
   000     17     13     R1  D   O 00134     F 00131    T 00 35
CP 001     17     13     R1      O 00138     F 00136    T 00 36
TD 001     17     13     R1      O 00217     F 00214    T 00 45
   000     17     13     R1  D   O 00259     F 00256    T 00 49
   000     17     13     R1      O 00265     F 00262    T 00 49
   000     17     13     R1  D   O 00271     F 00267    T 00 50
   000     17     13     R1      O 00277     F 00273    T 00 50
   000     17     13     R1  D   O 00318     F 00315    T 00 55
   000     17     13     R1      O 00322     F 00318    T 00 55
TA 003     17     13     R1      O 00470     F 00469    T 01 35
CP 002     17     13     R1      O 00764     F 00763    T 02 32
CP 003     17     13     R1      O 01142     F 01138    T 03 07
   000     14     06     R1      O 01739     F 01734    T 04 43
   000     14     06     R1  D   O 01746     F 01741    T 04 44
   000     14     06     R1      O 01752     F 01747    T 04 44
CP 004     14     06     R1  D   O 01771     F 01765    T 04 46
   000     14     06     R1      O 01776     F 01771    T 04 46
DO 002     14     06     R1      O 01876     F 01871    T 04 58
DC 002     14     06     R1      O 01876     F 01871    T 05 09
TD 002     14     06     R1      O 01901     F 01898    T 05 15
TA 004     14     06     R1  D   O 01913     F 01909    T 05 17
   000     14     06     R1      O 01915     F 01912    T 05 17
CP 005     14     06     R1      O 02163     F 02160    T 05 39
CP 006     14     06     R1      O 02397     F 02394    T 06 00
CP 007     14     06     R1      O 02603     F 02599    T 06 43
CP 008     14     06     R1      O 02890     F 02885    T 07 18
   000     14     08     R2  W   O 03373     F 03367    T 08 35
CP 009     14     08     R2  W   O 03547     F 03539    T 08 49
CP 010     14     08     R2  W   O 03889     F 03880    T 09 20
CP 011     14     08     R2  W   O 00014     F 04101    T 09 39
   000     15     13     R1      O 00294     F 04380    T 10 03
TD 003     15     13     R1      O 00421     F 04507    T 10 14
   000     15     13     R1  D   O 00455     F 04540    T 10 17
   000     15     13     R1      O 00460     F 04546    T 10 17
   000     15     13     R1  D   O 00506     F 04591    T 10 21
   000     15     13     R1      O 00513     F 04598    T 10 21
CP 012     15     13     R1      O 00828     F 04912    T 10 51
TA 005     15     13     R1      O 00905     F 04988    T 11 05
CP 013     15     13     R1      O 01124     F 05204    T 12 23
CP 014     15     13     R1      O 01353     F 05433    T 12 55
CP 015     15     13     R1      O 01577     F 05656    T 13 13
CP 016     15     13     R1      O 01805     F 05883    T 13 32
TA 006     15     13     R1      O 01969     F 06046    T 13 43
CP 017     15     13     R1      O 02472     F 06546    T 14 29
CP 018     15     13     R1      O 02529     F 06603    T 14 38
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B. Klein 1/18/77

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.L FRUMP.LDA

.DT 14156
     28
RUN 023  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 15  HOUR 13  MIN 30

FIFTH WHEEL FEET/PULSE  0002    ODOMETER FEET/PULSE  0002
TA 001     00     00     R1      O 00011     F 00012    T 00 06
TA 002     00     00     R1      O 00073     F 00073    T 00 15
   000     17     13     R1      O 00105     F 00104    T 00 19
DP 001     17     13     R1 D    O 00140     F 00139    T 00 23
   000     17     13     R1      O 00146     F 00145    T 00 23
DO 001     17     13     R1      O 00193     F 00197    T 00 31
DC 001     17     13     R1      O 00193     F 00197    T 00 40
TD 001     17     13     R1      O 00222     F 00221    T 00 46
   000     17     13     R1 D    O 00264     F 00262    T 00 49
   000     17     13     R1      O 00271     F 00269    T 00 50
   000     17     13     R1 D    O 00273     F 00277    T 00 50
   000     17     13     R1      O 00235     F 00234    T 00 51
   000     17     13     R1 D    O 00330     F 00329    T 00 54
   000     17     13     R1      O 00337     F 00336    T 00 54
TA 003     17     13     R1      O 00477     F 00477    T 01 07
DP 002     17     13     R1      O 00765     F 00766    T 01 41
DP 003     17     13     R1      O 01141     F 01142    T 02 22
   000     14     06     R1      O 01741     F 01741    T 03 35
DP 004     14     06     R1      O 01759     F 01759    T 03 53
TD 002     14     06     R1      O 01393     F 01399    T 04 32
TA 004     14     06     R1 D    O 01913     F 01916    T 04 35
   000     14     06     R1      O 01916     F 01919    T 04 35
   000     14     06     R1 D    O 01930     F 01933    T 04 33
   000     14     06     R1      O 01933     F 01936    T 04 33
DP 005     14     06     R1      O 02161     F 02164    T 05 41
DP 006     14     06     R1      O 02333     F 02392    T 06 09
DP 007     14     06     R1      O 02596     F 02601    T 06 53
DP 008     14     06     R1      O 02330     F 02335    T 07 26
   000     14     03     R3 W    O 03363     F 03369    T 08 53
DP 010     14     03     R3 W    O 03331     F 03336    T 09 35
DP 011     14     03     R3 W    O 00001     F 04103    T 09 51
   000     15     13     R1      O 00237     F 04333    T 10 13
   000     15     13     R1 D    O 00323     F 04431    T 10 22
   000     15     13     R1      O 00332     F 04434    T 10 22
TD 003     15     13     R1      O 00411     F 04513    T 10 37
   000     15     13     R1 D    O 00440     F 04542    T 10 40
   000     15     13     R1      O 00446     F 04543    T 10 40
   000     15     13     R1 D    O 00496     F 04593    T 10 44
   000     15     13     R1      O 00502     F 04604    T 10 46
DP 012     15     13     R1      O 00311     F 04914    T 11 24
TA 005     15     13     R1      O 00339     F 04990    T 12 16
DP 013     15     13     R1      O 01103     F 05203    T 12 53
DP 014     15     13     R1      O 01332     F 05432    T 13 20
DP 015     15     13     R1      O 01553     F 05659    T 13 37
DP 016     15     13     R1      O 01736     F 05836    T 13 57
TA 006     15     13     R1      O 01946     F 06044    T 14 11
DP 017     15     13     R1      O 02452     F 06550    T 14 45
DP 018     15     13     R1      O 02506     F 06603    T 14 54
   000     12     06     R1      O 02636     F 06734    T 15 05
DO 004     12     06     R1      O 02765     F 06862    T 15 20
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B. Kliem 1/18/77

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.OT 14156

RUN 029  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 19  HOUR 15  MIN 00

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001     00     00     R1        O 00006    F 00007    T 00 03
TA 002     00     00     R1        O 00073    F 00079    T 00 17
   000     17     13     R1        O 00107    F 00107    T 00 20
   000     17     13     R1  D     O 00133    F 00132    T 00 23
   000     17     13     R1        O 00138    F 00137    T 00 23
   000     17     13     R1  D     O 00149    F 00149    T 00 24
   000     17     13     R1        O 00155    F 00154    T 00 25
TD 001     17     13     R1        O 00234    F 00234    T 00 31
   000     17     13     R1  D     O 00259    F 00259    T 00 33
   000     17     13     R1        O 00266    F 00266    T 00 33
   000     17     13     R1  D     O 00302    F 00301    T 00 36
   000     17     13     R1        O 00306    F 00305    T 00 37
   000     17     13     R1  D     O 00330    F 00330    T 00 39
   000     17     13     R1        O 00335    F 00334    T 00 40
TA 003     17     13     R1        O 00470    F 00470    T 01 21
OP 002     17     13     R1        O 00764    F 00766    T 02 21
OP 003     17     13     R1        O 01138    F 01140    T 03 50
   000     10     06     R3  N     O 01557    F 01558    T 05 21
   000     14     06     R1        O 01726    F 01728    T 05 41
   000     14     06     R1  D     O 01746    F 01747    T 05 42
   000     14     06     R1        O 01752    F 01753    T 05 43
OP 004     14     06     R1  D     O 01764    F 01765    T 05 44
   000     14     06     R1        O 01771    F 01771    T 05 44
DO 002     14     06     R1        O 01850    F 01851    T 05 54
DC 002     14     06     R1        O 01853    F 01854    T 06 04
TD 002     14     06     R1        O 01898    F 01899    T 06 11
   000     14     06     R1  D     O 01907    F 01909    T 06 12
TA 004     14     06     R1        O 01910    F 01912    T 06 13
   000     14     06     R1  D     O 01916    F 01919    T 06 14
   000     14     06     R1        O 01919    F 01922    T 06 14
   000     14     06     R1  D     O 01926    F 01929    T 06 15
   000     14     06     R1        O 01930    F 01933    T 06 16
   000     14     06     R1  D     O 01962    F 01966    T 06 19
   000     14     06     R1        O 01969    F 01971    T 06 19
OP 005     14     06     R1        O 02157    F 02159    T 06 35
OP 006     14     06     R1        O 02385    F 02388    T 06 54
OP 007     14     06     R1        O 02597    F 02600    T 07 39
OP 008     14     06     R1        O 02878    F 02880    T 08 07
OP 009     14     06     R1        O 03529    F 03532    T 09 39
OP 010     14     06     R1        O 03874    F 03878    T 10 06
OP 011     14     06     R1        O 04039    F 04093    T 10 22
   000     15     13     R1        O 00279    F 04378    T 11 25
   000     15     13     R1  D     O 00304    F 04403    T 11 27
   000     15     13     R1        O 00310    F 04409    T 11 28
DO 003     15     13     R1        O 00378    F 04479    T 11 41
DC 003     15     13     R1        O 00378    F 04479    T 12 01
TD 003     15     13     R1        O 00411    F 04513    T 12 09
   000     15     13     R1  D     O 00441    F 04542    T 12 11
   000     15     13     R1        O 00447    F 04543    T 12 12
   000     15     13     R1  D     O 00497    F 04593    T 12 15
   000     15     13     R1        O 00504    F 04606    T 12 16
OP 012     15     13     R1        O 00810    F 04912    T 12 43
TA 005     15     13     R1        O 00832    F 04933    T 12 53
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1/18/77 B. Klein

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.L FRUMP.LDA

.ST 14156

RUN 030  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 15  HOUR 17  MIN 15

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001     00      00     R1       O 00006     F 00007    T 00 12
TA 002     00      00     R1       O 00076     F 00077    T 00 21
   000     17      13     R1       O 00103     F 00102    T 00 25
   000     17      13     R1  D    O 00134     F 00132    T 00 28
CP 001     17      13     R1       O 00138     F 00137    T 00 29
DO 001     17      13     R1       O 00170     F 00170    T 00 37
DC 001     17      13     R1       O 00170     F 00170    T 00 43
TD 001     17      13     R1       O 00221     F 00221    T 00 52
   000     17      13     R1  D    O 00258     F 00258    T 00 55
   000     17      13     R1       O 00264     F 00263    T 00 56
   000     17      13     R1  D    O 00275     F 00274    T 00 57
   000     17      13     R1       O 00281     F 00280    T 00 57
   000     17      13     R1  D    O 00316     F 00315    T 01 00
   000     17      13     R1       O 00322     F 00321    T 01 01
TA 003     17      13     R1       O 00475     F 00475    T 01 16
CP 002     17      13     R1       O 00760     F 00760    T 01 51
CP 003     17      13     R1       O 01140     F 01139    T 02 23
   000     14      06     R1       O 01748     F 01746    T 03 55
CP 004     14      06     R1       O 01767     F 01765    T 03 57
   000     14      06     R1  D    O 01774     F 01772    T 03 57
   000     14      06     R1       O 01780     F 01778    T 03 58
DO 002     14      06     R1       O 01866     F 01864    T 04 08
DC 002     14      06     R1       O 01869     F 01868    T 04 18
TD 002     14      06     R1       O 01899     F 01898    T 04 25
TA 004     14      06     R1       O 01913     F 01912    T 04 29
   000     14      06     R1  D    O 01914     F 01914    T 04 31
   000     14      06     R1       O 01915     F 01916    T 04 31
CP 005     14      06     R1       O 02163     F 02163    T 05 43
CP 006     14      06     R1       O 02393     F 02392    T 06 07
CP 007     14      06     R1       O 02604     F 02604    T 07 01
   000     10      06     R3  N    O 02608     F 02607    T 07 02
CP 008     10      06     R3  N    O 02883     F 02881    T 08 22
CP 009     10      06     R3  N    O 03544     F 03539    T 10 12
CP 010     10      06     R3  N    O 03883     F 03879    T 11 20
CP 011     10      06     R3  N    O 00011     F 04101    T 11 41
   000     15      13     R1       O 00293     F 04383    T 12 53
   000     15      13     R1  D    O 00322     F 04412    T 12 55
   000     15      13     R1       O 00328     F 04418    T 12 56
DO 003     15      13     R1       O 00399     F 04489    T 13 07
DC 003     15      13     R1       O 00399     F 04489    T 13 27
TD 003     15      13     R1       O 00417     F 04507    T 13 35
   000     15      13     R1  D    O 00510     F 04600    T 13 44
   000     15      13     R1       O 00517     F 04607    T 13 44
CP 012     15      13     R1       O 00827     F 04916    T 14 15
TA 005     15      13     R1       O 00901     F 04988    T 14 25
CP 013     15      13     R1       O 01113     F 05200    T 15 54
CP 014     15      13     R1       O 01342     F 05429    T 16 26
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L FRUMP.LDA

.ST 14156

RUN 031   SAMPLE RATE 00.5   YEAR 77   MONTH 01   DAY 15   HOUR 18   MIN 45

FIFTH WHEEL FEET/PULSE   0002     ODOMETER FEET/PULSE   0002
TA 001      00      00     R1       O 00010     F 00010    T 00 12
TA 002      00      00     R1       O 00076     F 00077    T 00 23
   000      17      13     R1       O 00122     F 00121    T 00 29
   000      17      13     R1  D    O 00135     F 00134    T 00 31
   000      17      13     R1       O 00139     F 00138    T 00 31
CP 001      17      13     R1       O 00143     F 00142    T 00 32
DO 001      17      13     R1       O 00181     F 00180    T 00 41
DC 001      17      13     R1       O 00187     F 00186    T 00 44
TD 001      17      13     R1       O 00223     F 00222    T 00 49
   000      17      13     R1  D    O 00269     F 00269    T 00 54
   000      17      13     R1       O 00275     F 00274    T 00 54
   000      17      13     R1  D    O 00299     F 00298    T 00 57
   000      17      13     R1       O 00303     F 00303    T 00 57
   000      17      13     R1  D    O 00312     F 00312    T 00 58
   000      17      13     R1       O 00317     F 00317    T 00 59
TA 003      17      13     R1       O 00470     F 00471    T 01 52
   000      17      13     R1       O 00686     F 00688    T 02 37
   000      17      13     R1       O 00690     F 00691    T 02 38
   000      17      13     R1       O 00694     F 00695    T 02 38
   000      17      13     R1       O 00699     F 00700    T 02 39
   000      17      13     R1       O 00703     F 00705    T 02 39
   000      17      13     R1       O 00708     F 00709    T 02 40
   000      17      13     R1       O 00713     F 00715    T 02 40
   000      17      13     R1       O 00718     F 00719    T 02 41
   000      17      13     R1       O 00723     F 00725    T 02 41
   000      17      13     R1       O 00729     F 00730    T 02 42
   000      17      13     R1       O 00734     F 00736    T 02 42
   000      17      13     R1       O 00740     F 00741    T 02 43
   000      17      13     R1       O 00746     F 00747    T 02 43
   000      17      13     R1       O 00751     F 00753    T 02 44
CP 002      17      13     R1       O 00757     F 00759    T 02 44
   000      17      13     R1       O 00763     F 00765    T 02 45
   000      17      13     R1       O 00769     F 00770    T 02 45
   000      17      13     R1       O 00774     F 00776    T 02 46
   000      17      13     R1       O 00780     F 00781    T 02 46
   000      17      13     R1       O 00785     F 00787    T 02 47
   000      17      13     R1       O 00790     F 00791    T 02 47
   000      17      13     R1       O 00795     F 00797    T 02 48
   000      17      13     R1       O 00800     F 00801    T 02 48
   000      17      13     R1       O 00804     F 00806    T 02 49
   000      17      13     R1       O 00809     F 00810    T 02 49
   000      17      13     R1       O 00813     F 00814    T 02 50
   000      17      13     R1       O 00817     F 00818    T 02 50
   000      17      13     R1       O 00821     F 00823    T 02 51
   000      17      13     R1       O 00825     F 00827    T 02 51
   000      17      13     R1       O 00829     F 00831    T 02 52
   000      17      13     R1       O 00834     F 00835    T 02 52
   000      17      13     R1       O 00838     F 00839    T 02 53
   000      17      13     R1       O 00842     F 00843    T 02 53
   000      17      13     R1       O 00846     F 00847    T 02 54
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B. Klein
1/18/77

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.L FRUMP.LDA

.ST 14156

RUN 032  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 15  HOUR 20  MIN 20

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001    00    00    R1     O 00007   F 00008   T 00 11
TA 002    00    00    R1     O 00076   F 00077   T 00 26
   000    17    13    R1     O 00107   F 00105   T 00 31
   000    17    13    R1 D   O 00110   F 00109   T 00 31
   000    17    13    R1     O 00114   F 00112   T 00 32
CP 001    17    13    R1 D   O 00137   F 00136   T 00 35
   000    17    13    R1     O 00141   F 00139   T 00 35
DO 001    17    13    R1     O 00182   F 00180   T 00 42
DC 001    17    13    R1     O 00184   F 00183   T 00 59
TD 001    17    13    R1     O 00222   F 00221   T 01 07
   000    17    13    R1 D   O 00256   F 00255   T 01 10
   000    17    13    R1     O 00261   F 00260   T 01 11
   000    17    13    R1 D   O 00306   F 00305   T 01 15
   000    17    13    R1     O 00312   F 00310   T 01 15
   000    17    13    R1 D   O 00329   F 00327   T 01 17
   000    17    13    R1     O 00335   F 00333   T 01 17
TA 003    17    13    R1     O 00474   F 00473   T 02 03
CP 002    17    13    R1     O 00761   F 00760   T 02 56
CP 003    17    13    R1     O 01140   F 01137   T 03 33
   000    14    06    R1     O 01745   F 01740   T 05 28
   000    14    06    R1 D   O 01750   F 01745   T 05 28
   000    14    06    R1     O 01755   F 01750   T 05 29
CP 004    14    06    R1 D   O 01771   F 01765   T 05 30
   000    14    06    R1     O 01775   F 01770   T 05 31
TD 002    14    06    R1     O 01898   F 01892   T 05 45
TA 004    14    06    R1 D   O 01915   F 01910   T 05 50
   000    14    06    R1     O 01917   F 01912   T 05 51
   000    14    06    R1 D   O 01936   F 01932   T 05 54
   000    14    06    R1     O 01939   F 01935   T 05 55
CP 005    14    06    R1     O 02166   F 02161   T 07 01
CP 006    14    06    R1     O 02397   F 02391   T 07 26
CP 007    14    06    R1     O 02605   F 02599   T 08 21
CP 008    14    06    R1     O 02892   F 02884   T 08 51
CP 009    14    06    R1     O 03548   F 03538   T 10 24
CP 010    14    06    R1     O 03888   F 03878   T 11 35
CP 011    14    06    R1     O 00013   F 04099   T 11 56
   000    15    13    R1     O 00298   F 04382   T 13 11
   000    15    13    R1 D   O 00324   F 04408   T 13 13
   000    15    13    R1     O 00329   F 04413   T 13 14
DO 003    15    13    R1     O 00399   F 04483   T 13 23
DC 003    15    13    R1     O 00401   F 04485   T 13 41
TD 003    15    13    R1     O 00421   F 04505   T 13 50
   000    15    13    R1 D   O 00516   F 04600   T 13 59
   000    15    13    R1     O 00523   F 04607   T 13 59
CP 012    15    13    R1     O 00827   F 04910   T 14 32
TA 005    15    13    R1     O 00902   F 04984   T 14 42
CP 013    15    13    R1     O 01120   F 05199   T 15 07
CP 014    15    13    R1     O 01343   F 05422   T 15 33
CP 015    15    13    R1     O 01575   F 05654   T 15 56
CP 016    15    13    R1     O 01790   F 05868   T 16 15
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1/18/77

B. Klein

1/18/77 O. Klims

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.DT 14156

RUN 034  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 16  HOUR 12  MIN 35

FIFTH WHEEL FEET/PULSE   0002   ODOMETER FEET/PULSE   0002
TA 001      00     00      R1       O 00008    F 00009    T 00 09
TA 002      00     00      R1       O 00076    F 00076    T 00 19
CP 001      17     13      R1       O 00133    F 00131    T 00 26
DO 001      17     13      R1       O 00178    F 00176    T 00 34
DC 001      17     13      R1       O 00181    F 00179    T 00 40
TD 001      17     13      R1       O 00222    F 00219    T 00 49
   000      17     13      R1  D    O 00253    F 00251    T 00 52
   000      17     13      R1       O 00259    F 00256    T 00 53
   000      17     13      R1  D    O 00312    F 00310    T 00 57
   000      17     13      R1       O 00318    F 00315    T 00 58
TA 003      17     13      R1       O 00471    F 00469    T 01 48
CP 002      17     13      R1       O 00758    F 00753    T 02 44
CP 003      17     13      R1       O 01130    F 01122    T 03 19
DO 002      17     13      R1       O 01563    F 01551    T 04 16
DC 002      17     13      R1       O 01565    F 01553    T 04 41
TD 002      17     13      R1       O 01586    F 01574    T 04 49
EE 002      17     13      R1       O 01686    F 01673    T 05 01
EE 002      17     13      R1       O 01708    F 01695    T 05 03
EE 002      17     13      R1       O 01731    F 01717    T 05 05
   000      14     06      R1       O 01753    F 01739    T 05 07
CP 004      14     06      R1  D    O 01769    F 01755    T 05 09
   000      14     06      R1       O 01773    F 01759    T 05 09
TD 002      14     06      R1       O 01897    F 01883    T 05 33
   000      14     06      R1  D    O 01912    F 01898    T 05 36
TA 004      14     06      R1       O 01914    F 01901    T 05 36
CP 005      14     06      R1       O 02167    F 02153    T 06 00
CP 006      14     06      R1       O 02397    F 02382    T 06 21
CP 007      14     06      R1       O 02606    F 02589    T 07 09
   000      10     06      R3  N    O 02612    F 02595    T 07 10
CP 008      10     06      R3  N    O 02888    F 02870    T 07 43
CP 009      10     06      R3  N    O 03544    F 03526    T 10 02
CP 010      10     06      R3  N    O 03879    F 03860    T 10 35
CP 011      10     06      R3  N    O 00001    F 04077    T 10 50
   000      15     13      R1       O 00290    F 04365    T 11 12
   000      15     13      R1  D    O 00319    F 04394    T 11 14
   000      15     13      R1       O 00324    F 04400    T 11 15
DO 003      15     13      R1       O 00390    F 04465    T 11 23
DC 003      15     13      R1       O 00399    F 04475    T 11 36
TD 003      15     13      R1       O 00422    F 04498    T 11 43
   000      15     13      R1  D    O 00455    F 04530    T 11 46
   000      15     13      R1       O 00462    F 04537    T 11 46
   000      15     13      R1  D    O 00506    F 04581    T 11 49
   000      15     13      R1       O 00514    F 04589    T 11 50
CP 012      15     13      R1       O 00822    F 04897    T 12 16
TA 005      15     13      R1       O 00902    F 04975    T 12 24
CP 013      15     13      R1       O 01117    F 05187    T 13 44
CP 014      15     13      R1       O 01338    F 05409    T 14 15
CP 015      15     13      R1       O 01570    F 05640    T 14 33
CP 016      15     13      R1       O 01791    F 05861    T 14 49
TA 006      15     13      R1       O 01961    F 06029    T 15 04
CP 017      15     13      R1       O 02464    F 06529    T 15 40
CP 018      15     13      R1       O 02524    F 06588    T 15 49
   000      12     06      R1       O 02659    F 06722    T 16 02
TD 004      12     06      R1       O 02788    F 06851    T 16 56
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wrong intersection

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.L FRUMP.LDA

.ST 14156
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B. Kliem 1/18/77

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RUN 035  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 16  HOUR 14  MIN 15

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001     00     00     R1      O 00007    F 00008    T 00 06
TA 002     00     00     R1      O 00078    F 00078    T 00 21
   000     17     13     R1      O 00120    F 00119    T 00 29
CP 001     17     13     R1      O 00134    F 00132    T 00 30
   000     17     13     R1  D   O 00138    F 00136    T 00 31
   000     17     13     R1      O 00143    F 00141    T 00 31
TD 001     17     13     R1      O 00221    F 00218    T 00 39
   000     17     13     R1  D   O 00260    F 00256    T 00 42
   000     17     13     R1      O 00266    F 00261    T 00 43
   000     17     13     R1  D   O 00321    F 00313    T 00 47
   000     17     13     R1      O 00327    F 00319    T 00 48
TA 003     17     13     R1      O 00474    F 00465    T 01 31
CP 002     17     13     R1      O 00767    F 00753    T 02 24
CP 003     17     13     R1      O 01140    F 01122    T 02 56
   000     14     06     R1      O 01744    F 01720    T 04 37
   000     14     06     R1  D   O 01750    F 01726    T 04 38
   000     14     06     R1      O 01757    F 01733    T 04 38
CP 004     14     06     R1  D   O 01770    F 01745    T 04 39
   000     14     06     R1      O 01777    F 01752    T 04 40
TD 002     14     06     R1      O 01903    F 01877    T 05 01
TA 004     14     06     R1  D   O 01920    F 01895    T 05 04
   000     14     06     R1      O 01922    F 01898    T 05 05
   000     14     06     R1  D   O 01959    F 01934    T 05 10
   000     14     06     R1      O 01963    F 01938    T 05 10
CP 005     14     06     R1      O 02171    F 02143    T 05 28
CP 006     14     06     R1      O 02403    F 02370    T 05 49
CP 007     14     06     R1      O 02612    F 02576    T 06 39
   000     10     06     R3  N   O 02615    F 02580    T 06 40
CP 008     10     06     R3  N   O 02890    F 02854    T 07 05
CP 009     10     06     R3  N   O 03547    F 03506    T 08 49
CP 010     10     06     R3  N   O 03886    F 03842    T 10 01
CP 011     10     06     R3  N   O 00016    F 04063    T 10 26
   000     15     13     R1      O 00295    F 04339    T 11 12
TD 003     15     13     R1      O 00430    F 04471    T 11 25
   000     15     13     R1  D   O 00470    F 04511    T 11 28
   000     15     13     R1      O 00476    F 04517    T 11 29
   000     15     13     R1  D   O 00518    F 04558    T 11 32
   000     15     13     R1      O 00525    F 04565    T 11 33
CP 012     15     13     R1      O 00837    F 04875    T 12 00
TA 005     15     13     R1      O 00908    F 04944    T 12 53
CP 013     15     13     R1      O 01130    F 05160    T 13 23
CP 014     15     13     R1      O 01352    F 05379    T 13 52
CP 015     15     13     R1      O 01584    F 05609    T 14 12
CP 016     15     13     R1      O 01822    F 05846    T 14 31
TA 006     15     13     R1      O 01973    F 05995    T 14 45
CP 017     15     13     R1      O 02476    F 06492    T 15 26
CP 018     15     13     R1      O 02534    F 06551    T 15 40
   000     12     06     R1      O 02662    F 06675    T 15 52
DO 004     12     06     R1      O 02784    F 06796    T 16 06
DC 004     12     06     R1      O 02786    F 06798    T 16 42
TD 004     12     06     R1      O 02811    F 06823    T 16 49
   000     12     06     R1  D   O 02840    F 06852    T 16 52
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.L FRUMP.LDA

.ST 14156
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1/18/77 B. Kliem

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RUN 036  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 16  HOUR 15  MIN 50

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE   0002
TA 001      00     00     R1      O 00009     F 00010    T 00 13
TA 002      00     00     R1      O 00071     F 00071    T 00 22
   000      17     13     R1      O 00120     F 00118    T 00 29
   000      17     13     R1 D    O 00129     F 00127    T 00 30
CP 001      17     13     R1      O 00134     F 00132    T 00 30
TD 001      17     13     R1      O 00220     F 00218    T 00 39
   000      17     13     R1 D    O 00255     F 00252    T 00 42
   000      17     13     R1      O 00260     F 00257    T 00 43
   000      17     13     R1 D    O 00316     F 00313    T 00 48
   000      17     13     R1      O 00322     F 00319    T 00 48
TA 003      17     13     R1      O 00473     F 00470    T 01 35
CP 002      17     13     R1      O 00764     F 00756    T 02 26
CP 003      17     13     R1      O 01145     F 01134    T 03 01
   000      14     06     R1      O 01742     F 01728    T 04 45
   000      14     06     R1 D    O 01748     F 01734    T 04 45
   000      14     06     R1      O 01754     F 01739    T 04 46
CP 004      14     06     R1 D    O 01771     F 01756    T 04 47
   000      14     06     R1      O 01776     F 01762    T 04 48
DO 002      14     06     R1      O 01885     F 01869    T 05 00
DC 002      14     06     R1      O 01891     F 01875    T 05 07
TD 002      14     06     R1      O 01911     F 01896    T 05 11
   000      14     06     R1 D    O 01921     F 01906    T 05 13
   000      14     06     R1      O 01923     F 01908    T 05 14
TA 004      14     06     R1      O 01926     F 01911    T 05 14
   000      14     06     R1 D    O 01939     F 01925    T 05 17
   000      14     06     R1      O 01943     F 01929    T 05 17
   000      14     06     R1 D    O 01969     F 01955    T 05 20
   000      14     06     R1      O 01975     F 01960    T 05 21
CP 005      14     06     R1      O 02172     F 02156    T 05 38
CP 006      14     06     R1      O 02405     F 02388    T 05 58
CP 007      14     06     R1      O 02615     F 02597    T 06 47
   000      10     06     R2 N    O 02617     F 02599    T 06 47
CP 008      10     06     R2 N    O 02900     F 02881    T 07 15
CP 009      10     06     R2 N    O 03558     F 03535    T 08 54
CP 010      10     06     R2 N    O 03898     F 03872    T 09 59
CP 011      10     06     R2 N    O 00026     F 04093    T 10 20
   000      15     13     R1      O 00310     F 04376    T 10 43
   000      15     13     R1 D    O 00372     F 04437    T 10 49
   000      15     13     R1      O 00376     F 04441    T 10 49
TD 003      15     13     R1      O 00439     F 04503    T 11 08
   000      15     13     R1 D    O 00527     F 04588    T 11 15
   000      15     13     R1      O 00534     F 04596    T 11 16
CP 012      15     13     R1      O 00842     F 04900    T 11 43
TA 005      15     13     R1      O 00917     F 04972    T 11 57
CP 013      15     13     R1      O 01134     F 05188    T 13 22
CP 014      15     13     R1      O 01360     F 05410    T 13 54
CP 015      15     13     R1      O 01585     F 05634    T 14 12
CP 016      15     13     R1      O 01809     F 05853    T 14 29
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B. Kliem 1/1

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ST 14156

RUN 037  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 16  HOUR 17  MIN 15

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001     00     00     R1      O 00005     F 00006     T 00 06
TA 002     00     00     R1      O 00075     F 00076     T 00 17
   000     17     13     R1      O 00123     F 00122     T 00 23
   000     17     13     R1  D   O 00131     F 00129     T 00 24
CP 001     17     13     R1      O 00135     F 00133     T 00 25
   000     17     13     R1  D   O 00147     F 00146     T 00 27
   000     17     13     R1      O 00151     F 00149     T 00 27
TD 001     17     13     R1      O 00219     F 00217     T 00 39
   000     17     13     R1  D   O 00258     F 00256     T 00 43
   000     17     13     R1      O 00263     F 00261     T 00 43
   000     17     13     R1  D   O 00274     F 00271     T 00 44
   000     17     13     R1      O 00279     F 00276     T 00 45
   000     17     13     R1  D   O 00333     F 00330     T 00 50
   000     17     13     R1      O 00338     F 00335     T 00 50
TA 003     17     13     R1      O 00478     F 00476     T 01 40
CP 002     17     13     R1      O 00770     F 00765     T 02 29
CP 003     17     13     R1      O 01143     F 01134     T 03 10
DC 007     00     68     R1      O 02135     F 22930     T 03 50 ← error record
   000     17     13     R1      O 01583     F 01571     T 04 08
   000     14     06     R1      O 01743     F 01730     T 05 07
   000     14     06     R1  D   O 01749     F 01736     T 05 07
   000     14     06     R1      O 01755     F 01742     T 05 08
CP 004     14     06     R1  D   O 01772     F 01759     T 05 09
   000     14     06     R1      O 01778     F 01765     T 05 10
DO 002     14     06     R1      O 01894     F 01880     T 05 24
DC 002     14     06     R1      O 01896     F 01882     T 05 29
   000     14     06     R1  D   O 01897     F 01884     T 05 29
   000     14     06     R1      O 01899     F 01885     T 05 30
TD 002     14     06     R1      O 01910     F 01897     T 05 32
   000     14     06     R1  D   O 01919     F 01908     T 05 34
   000     14     06     R1      O 01922     F 01910     T 05 35
TA 004     14     06     R1      O 01941     F 01930     T 05 38
CP 005     14     06     R1      O 02172     F 02155     T 05 58
CP 006     14     06     R1      O 02395     F 02377     T 06 19
CP 007     14     06     R1      O 02610     F 02590     T 07 12
CP 008     14     06     R1      O 02894     F 02873     T 08 27
   000     14     08     R3  W   O 03377     F 03353     T 09 58
CP 009     14     08     R3  W   O 03556     F 03531     T 10 15
CP 010     14     08     R3  W   O 03894     F 03568     T 10 45
CP 011     14     08     R3  W   O 00021     F 04091     T 11 03
   000     15     13     R1      O 00311     F 04379     T 11 48
   000     15     13     R1  D   O 00327     F 04395     T 11 49
   000     15     13     R1      O 00333     F 04400     T 11 50
DO 003     15     13     R1      O 00409     F 04476     T 12 03
DC 003     15     13     R1      O 00409     F 04476     T 12 30
TD 003     15     13     R1      O 00428     F 04494     T 12 38
   000     15     13     R1  D   O 00522     F 04586     T 12 46
   000     15     13     R1      O 00529     F 04593     T 12 46
CP 012     15     13     R1      O 00839     F 04901     T 13 14
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1/18/77 B. Klien

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.L FRUMP.LDA

.ST 14156

RUN 038  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 16  HOUR 20  MIN 40

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001    00    00    R1      O 00007    F 00008    T 00 15
TA 002    00    00    R1      O 00079    F 00079    T 00 27   R1
   000    17    13    R1      O 00123    F 00121    T 00 33
   000    17    13    R1  D   O 00137    F 00134    T 00 35
CP 001    17    13    R1      O 00141    F 00139    T 00 35
TD 001    17    13    R1      O 00228    F 00224    T 00 44
   000    17    13    R1  D   O 00261    F 00258    T 00 47
   000    17    13    R1      O 00267    F 00264    T 00 47
TA 003    17    13    R1      O 00471    F 00467    T 01 25
CP 002    17    13    R1      O 00767    F 00760    T 02 15
CP 003    17    13    R1      O 01145    F 01133    T 02 49
   000    14    06    R1      O 01767    F 01750    T 03 43
CP 004    14    06    R1  D   O 01778    F 01761    T 03 44
   000    14    06    R1      O 01784    F 01766    T 03 45
   000    14    06    R1  D   O 01910    F 01891    T 03 58
TD 002    14    06    R1      O 01913    F 01894    T 03 58
TA 004    14    06    R1  D   O 01924    F 01906    T 04 01
   000    14    06    R1      O 01927    F 01909    T 04 01
CP 005    14    06    R1      O 02176    F 02157    T 05 11
CP 006    14    06    R1      O 02403    F 02383    T 05 47
CP 007    14    06    R1      O 02617    F 02596    T 06 27
CP 008    14    06    R1      O 02896    F 02873    T 06 51
   000    14    08    R3  W   O 03390    F 03365    T 07 36
CP 009    14    08    R3  W   O 03560    F 03533    T 08 23   2X
CP 010    14    08    R3  W   O 03901    F 03872    T 08 53
CP 011    14    08    R3  W   O 00023    F 04089    T 09 11
   000    15    13    R1      O 00315    F 04379    T 09 36
   000    15    13    R1  D   O 00374    F 04437    T 09 44
   000    15    13    R1      O 00376    F 04440    T 09 44
DO 003    15    13    R1      O 00415    F 04479    T 09 55
DC 003    15    13    R1      O 00415    F 04479    T 10 01
TD 003    15    13    R1      O 00440    F 04503    T 10 07
   000    15    13    R1  D   O 00453    F 04516    T 10 08
   000    15    13    R1      O 00457    F 04520    T 10 09
   000    15    13    R1  D   O 00472    F 04535    T 10 10
   000    15    13    R1      O 00478    F 04540    T 10 11
   000    15    13    R1  D   O 00512    F 04574    T 10 14
   000    15    13    R1      O 00518    F 04580    T 10 14
CP 012    15    13    R1      O 00845    F 04906    T 10 45
TA 005    15    13    R1      O 00916    F 04975    T 10 54
CP 013    15    13    R1      O 01131    F 05187    T 12 02
CP 014    15    13    R1      O 01363    F 05418    T 12 36
CP 015    15    13    R1      O 01591    F 05643    T 12 57
CP 016    15    13    R1      O 01814    F 05866    T 13 15
TA 006    15    13    R1      O 01987    F 06035    T 13 34
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1/18/77 B. Kliem

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.L FRUMP.LDA

.ST 14156

RUN 039  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 17  HOUR 10  MIN 15

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
   000     00     00     R1  D    O 00000    F 00000    T 00 00
   000     00     00     R1       O 00000    F 00000    T 00 01
TA 001     00     00     R1       O 00006    F 00006    T 00 23
TA 002     00     00     R1       O 00076    F 00075    T 00 34
CP 001     00     00     R1       O 00140    F 00137    T 00 43
   000     17     13     R1       O 00149    F 00147    T 00 44
TD 001     17     13     R1       O 00223    F 00220    T 00 54
   000     17     13     R1  D    O 00261    F 00258    T 00 58
   000     17     13     R1       O 00268    F 00264    T 00 58
   000     17     13     R1  D    O 00320    F 00316    T 01 02
   000     17     13     R1       O 00326    F 00323    T 01 03
TA 003     17     13     R1       O 00473    F 00470    T 01 45
CP 002     17     13     R1       O 00763    F 00759    T 02 32
CP 003     17     13     R1       O 01144    F 01137    T 03 06
   000     14     06     R1       O 01761    F 01749    T 04 00
CP 004     14     06     R1  D    O 01773    F 01761    T 04 01
   000     14     06     R1       O 01778    F 01766    T 04 02
DO 002     14     06     R1       O 01885    F 01871    T 04 13
DC 002     14     06     R1       O 01892    F 01879    T 04 22
TD 002     14     06     R1       O 01908    F 01895    T 04 27
   000     14     06     R1  D    O 01919    F 01907    T 04 29
TA 004     14     06     R1       O 01922    F 01910    T 04 29
CP 005     14     06     R1       O 02176    F 02164    T 05 35
CP 006     14     06     R1       O 02399    F 02386    T 05 59
CP 007     14     06     R1       O 02612    F 02596    T 06 57
CP 008     14     06     R1       O 02895    F 02879    T 07 24
   000     14     08     R2  W    O 03383    F 03362    T 08 45
CP 009     14     08     R2  W    O 03553    F 03531    T 09 03
CP 010     14     08     R2  W    O 03892    F 03869    T 09 31
CP 011     14     08     R2  W    O 00020    F 04092    T 10 26
   000     15     13     R1       O 00302    F 04371    T 10 54
   000     15     13     R1  D    O 00306    F 04376    T 10 55
   000     15     13     R1       O 00311    F 04380    T 10 55
   000     15     13     R1  D    O 00330    F 04399    T 10 58
   000     15     13     R1       O 00333    F 04402    T 10 58
   000     15     13     R1  D    O 00347    F 04417    T 11 02
   000     15     13     R1       O 00349    F 04418    T 11 02
DO 003     15     13     R1       O 00353    F 04421    T 11 05
DC 003     15     13     R1       O 00358    F 04427    T 11 20
TD 003     15     13     R1       O 00403    F 04472    T 11 31
   000     15     13     R1  D    O 00470    F 04538    T 11 38
   000     15     13     R1       O 00476    F 04544    T 11 38
   000     15     13     R1  D    O 00509    F 04577    T 11 41
   000     15     13     R1       O 00516    F 04583    T 11 41
CP 012     15     13     R1       O 00841-   F 04906    T 12 13
TA 005     15     13     R1       O 00915    F 04978    T 12 21
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.ST 14156

RUN 040  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 17  HOUR 12  MIN 15

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
TA 001     00     00     R1      O 00004    F 00004    T 00 06
TA 002     00     00     R1      O 00073    F 00073    T 00 16
   000     17     13     R1      O 00130    F 00128    T 00 23
   000     17     13     R1  D   O 00135    F 00133    T 00 23
CP 001     17     13     R1      O 00139    F 00137    T 00 24
TD 001     17     13     R1      O 00215    F 00213    T 00 31
   000     17     13     R1  D   O 00252    F 00249    T 00 35
   000     17     13     R1      O 00256    F 00254    T 00 35
   000     17     13     R1  D   O 00266    F 00263    T 00 36
   000     17     13     R1      O 00271    F 00268    T 00 37
   000     17     13     R1  D   O 00275    F 00272    T 00 37
   000     17     13     R1      O 00280    F 00277    T 00 38
   000     17     13     R1  D   O 00322    F 00319    T 00 42
   000     17     13     R1      O 00327    F 00324    T 00 42
TA 003     17     13     R1      O 00472    F 00470    T 01 17
CP 002     17     13     R1      O 00763    F 00760    T 02 07
CP 003     17     13     R1      O 01140    F 01136    T 02 39
   000     14     06     R1      O 01753    F 01746    T 04 22
   000     14     06     R1  D   O 01765    F 01757    T 04 23
CP 004     14     06     R1      O 01771    F 01763    T 04 24
DO 002     14     06     R1      O 01870    F 01862    T 04 35
DC 002     14     06     R1      O 01870    F 01862    T 04 46
TD 002     14     06     R1      O 01901    F 01893    T 04 52
   000     14     06     R1  D   O 01913    F 01905    T 04 54
TA 004     14     06     R1      O 01915    F 01908    T 04 54
CP 005     14     06     R1      O 02166    F 02158    T 05 18
CP 006     14     06     R1      O 02396    F 02388    T 05 38
CP 007     14     06     R1      O 02605    F 02596    T 06 30
CP 008     14     06     R1      O 02887    F 02877    T 06 58
   000     14     06     R2  E   O 03370    F 03358    T 08 20
CP 009     14     06     R2  E   O 03547    F 03535    T 09 19
CP 010     14     06     R2  E   O 03890    F 03875    T 09 55
CP 011     14     06     R2  E   O 00010    F 04090    T 10 17
   000     15     13     R1      O 00293    F 04373    T 11 16
   000     15     13     R1  D   O 00319    F 04399    T 11 18
   000     15     13     R1      O 00324    F 04404    T 11 19
DO 003     15     13     R1      O 00355    F 04434    T 11 32
DC 003     15     13     R1      O 00355    F 04434    T 11 47
TD 003     15     13     R1      O 00423    F 04502    T 11 58
   000     15     13     R1  D   O 00500    F 04578    T 12 04
   000     15     13     R1      O 00506    F 04585    T 12 05
CP 012     15     13     R1      O 00828    F 04906    T 12 42
TA 005     15     13     R1      O 00903    F 04979    T 12 52
CP 013     15     13     R1      O 01123    F 05197    T 13 31
CP 014     15     13     R1      O 01346    F 05419    T 13 51
CP 015     15     13     R1      O 01574    F 05645    T 14 47
CP 016     15     13     R1      O 01802    F 05872    T 15 13
TA 006     15     13     R1      O 01962    F 06031    T 15 33
CP 017     15     13     R1      O 02479    F 06543    T 16 14
CP 018     15     13     R1      O 02533    F 06597    T 16 27
   000     12     06     R1      O 02663    F 06726    T 16 39
   000     12     06     R1  D   O 02669    F 06732    T 16 40
   000     12     06     R1      O 02674    F 06737    T 16 40
   000     12     06     R1  D   O 02695    F 06758    T 16 42
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1/18/77

B. Klein

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.Z CT1:

.ST 1444


.L FRUMP.LDA

.ST 14156
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1/18/77 B. Klien

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RUN 041   SAMPLE RATE 00.5   YEAR 77   MONTH 01   DAY 17   HOUR 15   MIN 35

FIFTH WHEEL FEET/PULSE   0002   ODOMETER FEET/PULSE   0002
    000       00       00      R1  D    O 00000      F  00000     T  00 00
    000       00       00      R1       O 00000      F  00000     T  00 01
TA  001       00       00      R1       O 00007      F  00008     T  00 12
TA  002       00       00      R1       O 00075      F  00076     T  00 21
    000       17       13      R1       O 00109      F  00107     T  00 26
    000       17       13      R1  D    O 00112      F  00111     T  00 26
    000       17       13      R1       O 00116      F  00115     T  00 27
CP  001       17       13      R1       O 00132      F  00130     T  00 29
    000       17       13      R1  D    O 00136      F  00134     T  00 29
    000       17       13      R1       O 00140      F  00139     T  00 30
DO  001       17       13      R1       O 00185      F  00183     T  00 38
DC  001       17       13      R1       O 00187      F  00185     T  00 43
TD  001       17       13      R1       O 00221      F  00219     T  00 48
    000       17       13      R1  D    O 00263      F  00260     T  00 52
    000       17       13      R1       O 00269      F  00266     T  00 53
    000       17       13      R1  D    O 00315      F  00313     T  00 56
    000       17       13      R1       O 00323      F  00320     T  00 57
TA  003       17       13      R1       O 00475      F  00473     T  01 10
CP  002       17       13      R1       O 00768      F  00764     T  01 45
CP  003       17       13      R1       O 01137      F  01130     T  02 17
    000       14       06      R1       O 01742      F  01732     T  03 09
    000       14       06      R1  D    O 01744      F  01733     T  03 10
    000       14       06      R1       O 01745      F  01735     T  03 10
    000       14       06      R1  D    O 01750      F  01739     T  03 12
    000       14       06      R1       O 01751      F  01741     T  03 12
    000       14       06      R1  D    O 01771      F  01761     T  03 23
    000       14       06      R1       O 01773      F  01763     T  03 24
CP  004       14       06      R1       O 01775      F  01765     T  03 24
DO  002       14       06      R1       O 01902      F  01891     T  03 48
DC  002       14       06      R1       O 01902      F  01891     T  04 10
TD  002       14       06      R1       O 01910      F  01899     T  04 14
    000       14       06      R1  D    O 01920      F  01911     T  04 16
    000       14       06      R1       O 01923      F  01914     T  04 16
TA  004       14       06      R1       O 01927      F  01918     T  04 17
CP  005       14       06      R1       O 02175      F  02165     T  04 49
CP  006       14       06      R1       O 02404      F  02393     T  05 09
CP  007       14       06      R1       O 02612      F  02600     T  06 00
CP  008       14       06      R1       O 02896      F  02883     T  07 07
    000       14       08      R3  W    O 03385      F  03371     T  07 59
CP  009       14       08      R3  W    O 03553      F  03539     T  08 47
CP  010       14       08      R3  W    O 03898      F  03882     T  09 15
CP  011       14       08      R3  W    O 00021      F  04099     T  09 31
    000       15       13      R1       O 00298      F  04377     T  10 39
    000       15       13      R1  D    O 00330      F  04408     T  10 41
    000       15       13      R1       O 00336      F  04414     T  10 42
    000       15       13      R1  D    O 00347      F  04425     T  10 43
    000       15       13      R1       O 00353      F  04430     T  10 43
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.DT 14156

RUN 042  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 17  HOUR 13  MIN 55

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002
    000    00    00    R1 D   O 00000   F 00000   T 00 00
    000    00    00    R1     O 00000   F 00000   T 00 01
 TA 001    00    00    R1     O 00012   F 00013   T 00 10
 TA 002    00    00    R1     O 00075   F 00076   T 00 19
    000    17    13    R1     O 00131   F 00129   T 00 26
 CP 001    17    13    R1     O 00135   F 00134   T 00 27
    000    17    13    R1 D   O 00140   F 00138   T 00 27
    000    17    13    R1     O 00144   F 00143   T 00 28
 TD 001    17    13    R1     O 00219   F 00217   T 00 34
    000    17    13    R1 D   O 00261   F 00259   T 00 38
    000    17    13    R1     O 00267   F 00265   T 00 38
    000    17    13    R1 D   O 00327   F 00326   T 00 43
    000    17    13    R1     O 00334   F 00332   T 00 44
 TA 003    17    13    R1     O 00471   F 00469   T 01 11
 CP 002    17    13    R1     O 00758   F 00756   T 02 02
 CP 003    17    13    R1     O 01142   F 01137   T 02 38
    000    14    06    R1     O 01761   F 01754   T 03 31
    000    14    06    R1 D   O 01766   F 01758   T 03 32
 CP 004    14    06    R1     O 01771   F 01764   T 03 32
 TD 002    14    06    R1     O 01905   F 01897   T 03 47
    000    14    06    R1 D   O 01919   F 01911   T 03 50
 TA 004    14    06    R1     O 01921   F 01914   T 03 50
 CP 005    14    06    R1     O 02167   F 02160   T 05 01
 CP 006    14    06    R1     O 02398   F 02391   T 05 22
 CP 007    14    06    R1     O 02606   F 02599   T 05 39
 CP 008    14    06    R1     O 02890   F 02882   T 06 37
 CP 009    14    06    R1     O 03547   F 03537   T 08 14
 CP 010    14    06    R1     O 03890   F 03878   T 08 52
 CP 011    14    06    R1     O 00012   F 04097   T 09 08
    000    15    13    R1     O 00294   F 04377   T 10 11
 DO 003    15    13    R1     O 00398   F 04482   T 10 24
 DC 003    15    13    R1     O 00398   F 04482   T 10 35
 TD 003    15    13    R1     O 00426   F 04509   T 10 44
    000    15    13    R1 D   O 00458   F 04540   T 10 47
    000    15    13    R1     O 00465   F 04547   T 10 47
    000    15    13    R1 D   O 00515   F 04597   T 10 51
    000    15    13    R1     O 00523   F 04604   T 10 51
 CP 012    15    13    R1     O 00828   F 04909   T 11 22
 TA 005    15    13    R1     O 00903   F 04983   T 11 32
 CP 013    15    13    R1     O 01120   F 05197   T 11 57
 CP 014    15    13    R1     O 01346   F 05422   T 12 28
 CP 015    15    13    R1     O 01569   F 05644   T 12 46
 CP 016    15    13    R1     O 01794   F 05869   T 13 03
 TA 006    15    13    R1     O 01963   F 06036   T 13 18
 CP 017    15    13    R1     O 02469   F 06539   T 13 56
 CP 018    15    13    R1     O 02525   F 06595   T 14 05
    000    12    06    R1     O 02657   F 06725   T 14 19
 DO 004    12    06    R1     O 02779   F 06847   T 14 31
 DC 004    12    06    R1     O 02783   F 06851   T 14 37
 TD 004    12    06    R1     O 02790   F 06859   T 14 41
    000    12    06    R1 D   O 02816   F 06885   T 14 45
    000    12    06    R1     O 02820   F 06888   T 14 45
 CP 019    12    06    R1     O 03241   F 07309   T 15 18
 TA 007    12    06    R1     O 03316   F 07382   T 15 27
 CP 020    12    06    R1     O 03983   F 08048   T 17 21
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.L FRUMP.LDA

.ST 14156

RUN 043  SAMPLE RATE 00.5  YEAR 77  MONTH 01  DAY 17  HOUR 20  MIN 30

FIFTH WHEEL FEET/PULSE  0002   ODOMETER FEET/PULSE  0002 .
   000     00     00     R1 D   O 00000     F 00000    T 00 00
   000     00     00     R1     O 00000     F 00000    T 00 01
TA 001     00     00     R1     O 00007     F 00007    T 00 09
TA 002     00     00     R1     O 00075     F 00074    T 00 13
   000     17     13     R1     O 00121     F 00119    T 00 23
   000     17     13     R1 D   O 00126     F 00124    T 00 24
CP 001     17     13     R1     O 00132     F 00129    T 00 24
TD 001     17     13     R1     O 00217     F 00214    T 00 31
   000     17     13     R1 D   O 00258     F 00255    T 00 35
   000     17     13     R1     O 00264     F 00261    T 00 35
   000     17     13     R1 D   O 00326     F 00323    T 00 40
   000     17     13     R1     O 00332     F 00329    T 00 41
TA 003     17     13     R1     O 00471     F 00468    T 01 09
CP 002     17     13     R1     O 00762     F 00757    T 02 02
CP 003     17     13     R1     O 01137     F 01131    T 02 44
   000     14     06     R1     O 01756     F 01747    T 04 22
CP 004     14     06     R1 D   O 01768     F 01758    T 04 23
   000     14     06     R1     O 01773     F 01764    T 04 24
   000     14     06     R1 D   O 01904     F 01894    T 04 39
   000     14     06     R1     O 01907     F 01897    T 04 39
TD 002     14     06     R1     O 01909     F 01900    T 04 40
   000     14     06     R1 D   O 01917     F 01908    T 04 41
TA 004     14     06     R1     O 01920     F 01911    T 04 42
CP 005     14     06     R1     O 02165     F 02155    T 05 08
CP 006     14     06     R1     O 02392     F 02381    T 05 58
CP 007     14     06     R1     O 02604     F 02592    T 06 28
CP 008     14     06     R1     O 02889     F 02875    T 06 53
   000     14     08     R2 W   O 03373     F 03357    T 07 47
CP 009     14     08     R2 W   O 03548     F 03532    T 08 16
CP 010     14     08     R2 W   O 03886     F 03868    T 08 46
CP 011     14     08     R2 W   O 00015     F 04092    T 09 06
   000     15     13     R1     O 00295     F 04372    T 10 14
TD 003     15     13     R1     O 00422     F 04497    T 10 45
   000     15     13     R1 D   O 00461     F 04536    T 10 48
   000     15     13     R1     O 00467     F 04542    T 10 49
   000     15     13     R1 D   O 00497     F 04571    T 10 51
   000     15     13     R1     O 00503     F 04577    T 10 52
CP 012     15     13     R1     O 00830     F 04904    T 11 26
TA 005     15     13     R1     O 00902     F 04974    T 11 35
CP 013     15     13     R1     O 01127     F 05197    T 12 56
CP 014     15     13     R1     O 01351     F 05420    T 13 26
CP 015     15     13     R1     O 01576     F 05645    T 13 44
CP 016     15     13     R1     O 01800     F 05868    T 14 00
TA 006     15     13     R1     O 01963     F 06029    T 14 14
CP 017     15     13     R1     O 02467     F 06529    T 14 53
CP 018     15     13     R1     O 02530     F 06591    T 15 04
   000     12     06     R1     O 02662     F 06723    T 15 18
   000     12     06     R1 D   O 02669     F 06729    T 15 19
   000     12     06     R1     O 02675     F 06736    T 15 19
   000     12     06     R1 D   O 02712     F 06772    T 15 22
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B. Klein 1/18/77

4.2 FIXED ROUTE DATA PROCESSING RESULTS

4.2.1 Location Subsystem (Checkpoint) and AVM System (Timepoint) Results

This subsection contains a complete listing of the output of the FRLS program for the Fixed Route Run 27. The checkpoint and timepoint error frequency density and cumulative error distribution tabular outputs are presented for all other fixed route runs. Timepoint data were obtained during location subsystem processing as a programming convenience, however, timepoint performance is the same for both location subsystem and system level algorithms in the HI^3 system. Three location error sheets are provided for Runs 14 , 24 , 34 , 40 , and 43. The first shows the result of running raw data through the FRLS program. The second sheet contains the manually computed results for those runs which contained tape read errors and the third sheet gives the overall error statistics for all checkpoints on that run.

FIXED ROUTE RUN #27 CHECKPOINT ERRORS

```
FIXED ROUTE RUN # 27 CHECKPOINT ERRORS

CP#   X(CP)   Y(CP)   SP#   SEG.   INCREM   COMP X   COMP Y   ERROR

  1   12431    4529    1      3       40.   12413.    4580.     54.
  2   12895    3792    1      4      559.   12886.    3807.     18.
  3   13632    3698    1      4     1305.   13626.    3711.     14.
  4   14904    3541    2      5       26.   14871.    3547.     34.
  5   15277    4035    2      6      449.   15263.    3934.    102.
  6   15334    4441    2      6      905.   15326.    4385.     56.
  7   15383    4869    2      6     1321.   15384.    4797.     72.
  8   15475    5453    2      6     1895.   15463.    5366.     88.
  9   15644    6735    2      6     3203.   15644.    6661.     74.
 10   15736    7421    2      6     3891.   15739.    7342.     79.
 11   15809    7838    2      6     4335.   15801.    7782.     57.
 12   16042    9499    3      7     1086.   16035.    9460.     40.
 13   16512    9618    3      8      372.   16435.    9641.     80.
 14   16941    9578    3      8      810.   16872.    9607.     75.
 15   17368    9554    3      8     1274.   17334.    9571.     38.
 16   17811    9507    3      8     1718.   17777.    9536.     45.
 17   18095    8454    3      9     1009.   18112.    8501.     50.
 18   18109    8343    3      9     1117.   18112.    8393.     50.
 19   17929    6962    4     10     1170.   17926.    6915.     47.
 20   16580    6988    4     11     1395.   16525.    6981.     56.
 21   15087    7167    4     11     2899.   15032.    7161.     56.
 22   14282    7260    4     11     3679.   14257.    7255.     25.
 23   13313    7718    5     13      551.   13339.    7715.     26.
 24   12500    8500    5     15      401.   12450.    8552.     72.
 25   11590    9350    5     15     1633.   11544.    9387.     58.
 26   12190   10181    6     18      943.   12170.   10196.     25.
 27   13151   10036    6     18     1895.   13114.   10072.     52.
 28   13130    9554    6     19      440.   13127.    9626.     72.
 29   13052    9039    6     19      974.   13045.    9099.     60.
 30   13699    7663    6     21      930.   13808.    7649.    110.
 31   15123    7495    7     22     1172.   15148.    7482.     28.
 32   15948    7393    7     22     2012.   15982.    7381.     36.
 33   16627    7326    7     22     2684.   16649.    7301.     33.
 34   17500    7204    7     22     3590.   17548.    7193.     50.
 35   18345    7054    7     22     4488.   18440.    7085.    100.
 36   18300    5657    8     25      297.   18347.    5646.     49.
 37   17779    5728    8     25      865.   17784.    5718.     12.
 38   16908    5840    8     25     1719.   16937.    5826.     32.
 39   16427    5897    8     25     2221.   16439.    5889.     14.
 40   15645    6003    8     25     3009.   15658.    5989.     19.
 41   14638    6127    9     29      427.   14627.    6043.     85.
 42   14717    5780    9     30      248.   14842.    5763.    126.
 43   14816    5222    9     31      632.   14811.    5131.     91.
 44   14055    5037    9     32      771.   14024.    5053.     35.
 45   13388    5138    9     32     1443.   13357.    5141.     31.
 46   12862    5200    9     32     2013.   12792.    5215.     71.
```

FIXED ROUTE RUN #27 CHECKPOINT ERRORS (CONT'D)

```
 CP#   X(CP)    Y(CP)   SP#    SEG.    INCREM   COMP X    COMP Y    ERROR

 47   11518    5369   10      33       810.  11543.    5386.       30.
 48   10787    5472   10      33      1448.  10911.    5474.      124.
 49   10462    5513   10      33      1888.  10475.    5535.       26.
 50    9558    5647   10      33      2860.   9513.    5669.       50.
 51    8740    5757   10      33      3616.   8764.    5774.       29.
 52    8145    5840   10      33      4250.   8136.    5861.       23.
 53    7537    6481   11      35       538.   7560.    6454.       35.
 54    7652    6971   11      35      1036.   7645.    6945.       27.
 55    8320    6948   11      36       609.   8264.    6955.       57.
 56    9345    6825   11      36      1655.   9301.    6818.       45.




*57    9894    6731   11      36      2211.   9852.    6745.       45.
 CT1:RUN027.001

 58   12136    6444   12      37      1184.  12134.    6444.        2.
 59   12561    6405   12      37      1594.  12541.    6391.       25.
 60   13099    6331   12      37      2164.  13106.    6316.       16.
 61   13452    6271   12      37      2504.  13443.    6272.        9.
 62   13455    5695   12      38       528.  13494.    5733.       55.
 63   13388    5138   12      38      1088.  13421.    5178.       51.
 64   13372    4812   12      38      1378.  13382.    4890.       79.
 65   13787    4668   12      39       367.  13721.    4656.       67.
 66   14242    4594   12      39       815.  14165.    4595.       77.
 67   15770    4381   13      40      1366.  15740.    4392.       32.
 68   16152    4347   13      40      1768.  16139.    4341.       14.
 69   17121    4202   13      40      2712.  17076.    4222.       50.
 70   17491    3736   13      41       410.  17495.    3756.       21.
 71   18691    3072   14      43      1294.  18713.    3068.       23.
 72   18782    3565   14      44       521.  18813.    3581.       35.
 73   18484    4477   14      45       448.  18469.    4489.       19.
 74   17621    4597   14      45      1344.  17579.    4593.       42.
 75   16706    4705   14      45      2228.  16701.    4696.       10.
 76   15624    4856   15      46       420.  15656.    4830.       42.
```

FIXED ROUTE RUN #27 CHECKPOINT ERRORS (CONT'D)

```
        ERROR FREQUENCY DENSITY

          ERROR      NO.     PERCENT OF
        INTERVAL   SAMPLES     SAMPLES

            0-  10     2        2.63
           10-  20     9       11.84
           20-  30    11       14.47
           30-  40    12       15.79
           40-  50     9       11.84
           50-  60    14       18.42
           60-  70     1        1.32
           70-  80     9       11.84
           80-  90     3        3.95
           90- 100     2        2.63
          100- 110     2        2.63
          120- 130     2        2.63

        CUMULATIVE ERRORS

        ERROR     # SAMPLES    PERCENT SAMPLES
                  LT  ERROR       LT ERROR

            10        2             2.63
            20       11            14.47
            30       22            28.95
            40       34            44.74
            50       43            56.58
            60       57            75.00
            70       58            76.32
            80       67            88.16
            90       70            92.11
           100       72            94.74
           110       74            97.37
           120       74            97.37
           130       76           100.00


AVERAGE ERROR       =   48.10
STANDARD DEVIATION  =   27.26
ELAPSED TIME        =  80: 0
ELAPSED DISTANCE    =  68512.   (5TH WHEEL)
ELAPSED DISTANCE    =  68650.   (ODOMETER )
```

FIXED ROUTE LS RUN 11

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 11a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	2	2.63
10- 20	8	10.53
20- 30	15	19.74
30- 40	6	7.89
40- 50	11	14.47
50- 60	4	5.26
60- 70	9	11.84
70- 80	9	11.84
80- 90	6	7.89
90- 100	2	2.63
100- 110	2	2.63
120- 130	2	2.63

CUMULATIVE ERRORS RUN 11a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	2	2.63
20	10	13.16
30	25	32.89
40	31	40.79
50	42	55.26
60	46	60.53
70	55	72.37
80	64	84.21
90	70	92.11
100	72	94.74
110	74	97.37
120	74	97.37
130	76	100.00

FIXED ROUTE LS RUN 11

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 11b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	2	13.33
1- 2	5	33.33
2- 3	2	13.33
3- 4	1	6.67
5- 6	3	20.00
10- 11	1	6.67
23- 24	1	6.67

CUMULATIVE ERRORS RUN 11b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	2	13.33
2	7	46.67
3	9	60.00
4	10	66.67
5	10	66.67
6	13	86.67
7	13	86.67
8	13	86.67
9	13	86.67
10	13	86.67
11	14	93.33
24	15	100.00

FIXED ROUTE LS RUN 12
LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY **RUN 12a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	2	2.63
10- 20	6	7.89
20- 30	15	19.74
30- 40	6	7.89
40- 50	4	5.26
50- 60	9	11.84
60- 70	7	9.21
70- 80	7	9.21
80- 90	5	6.58
90- 100	7	9.21
100- 110	4	5.26
110- 120	1	1.32
120- 130	1	1.32
130- 140	1	1.32
140- 150	1	1.32

CUMULATIVE ERRORS **RUN 12a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	2	2.63
20	8	10.53
30	23	30.26
40	29	38.16
50	33	43.42
60	42	55.26
70	49	64.47
80	56	73.68
90	61	80.26
100	68	89.47
110	72	94.74
120	73	96.05
130	74	97.37
140	75	98.68
150	76	100.00

FIXED ROUTE LS RUN 12

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY **RUN 12b**

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	3	20.00
1- 2	1	6.67
2- 3	5	33.33
4- 5	2	13.33
5- 6	1	6.67
8- 9	1	6.67
12- 13	1	6.67
27- 28	1	6.67

CUMULATIVE ERRORS **RUN 12b**

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	3	20.00
2	4	26.67
3	9	60.00
4	9	60.00
5	11	73.33
6	12	80.00
9	13	86.67
13	14	93.33
28	15	100.00

FIXED ROUTE LS RUN 13

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 13a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	1	1.32
10- 20	8	10.53
20- 30	13	17.11
30- 40	8	10.53
40- 50	11	14.4777
50- 60	7	9.21
60- 70	6	7.89
70- 80	8	10.53
80- 90	5	6.58
90- 100	4	5.26
100- 110	2	2.63
110- 120	2	2.63
140- 150	1	1.32

CUMULATIVE ERRORS RUN 13a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	1	1.32
20	9	11.84
30	22	28.95
40	30	39.47
50	41	53.95
60	48	63.16
70	54	71.05
80	62	81.58
90	67	88.16
100	71	93.42
110	73	96.05
120	75	98.68
130	75	98.68
140	75	98.68
150	76	100.00

FIXED ROUTE LS RUN 13

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 13b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	3	20.00
1- 2	2	13.33
2- 3	3	20.00
3- 4	1	6.67
4- 5	2	13.33
6- 7	1	6.67
13- 14	1	6.67
15- 16	1	6.67
42- 43	1	6.67

CUMULATIVE ERRORS RUN 13b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	3	20.00
2	5	33.33
3	8	53.33
4	9	60.00
5	11	73.33
6	11	73.33
7	12	80.00
14	13	86.67
15	13	86.67
16	14	93.33
43	15	100.00

FIXED ROUTE LS RUN 14

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 14a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	4	7.41
10- 20	7	12.96
20- 30	9	16.67
30- 40	11	20.37
40- 50	1	1.85
50- 60	5	9.26
60- 70	5	9.26
70- 80	5	9.26
80- 90	4	7.41
90- 100	1	1.85
100- 110	2	3.70

CUMULATIVE ERRORS RUN 14a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	4	7.41
20	11	20.37
30	20	37.04
40	31	57.41
50	32	59.26
60	37	68.52
70	42	77.78
80	47	87.04
90	51	94.44
100	52	96.30
110	54	100.00

MANUALLY PROCESSED FIXED ROUTE LS DATA, RUN 14

FIXED ROUTE RUN#   CHECKPOINT ERRORS

CP#	X(CP)	Y(CP)	SP#	SEG.	INCREM	COMP X	COMP Y	ERROR
55	8320	6948	11	36	577	8232	6959	89
56	9345	6825	11	36	1615	9261	6823	84
57	9894	6731	11	36	2155	9796	6753	100
58	12136	6444	12	37	1178	12128	6445	8
59	12561	6405	12	37	1560	12507	6395	55
60	13099	6331	12	37	2140	13082	6319	21
61	13452	6271	12	37	2464	13403	6377	49
62	13455	5695	12	38	486	13500	5774	91
63	13388	5138	12	38	1046	13426	5219	89
64	13372	4812	12	38	1338	13388	4930	119
65	13787	4668	12	39	337	13691	4660	96
66	14242	4594	12	39	781	14131	4559	116
67	15770	4381	13	40	1368	15742	4392	30
68	16152	4347	13	40	1770	16141	4341	13
69	17121	4202	13	40	2702	17066	4224	59
70	17491	3956	13	41	408	17495	3751	22
71	18691	3072	14	43	1232	18651	3073	40
72	18782	3565	14	44	459	18806	3520	51
73	18484	4477	14	45	386	18531	4482	47
74	17621	4597	14	45	1272	17650	4585	31
75	16706	4705	14	45	2170	16758	4690	54
76	15624	4856	15	46	430	15646	4831	33

LOCATION SUBSYSTEM ERROR STATISTICS, RUN 14

ERROR FREQUENCY DENSITY RUN 14a

Error Interval	No. Samples	Percent of Samples
0- 10	5	6.57
10- 20	8	10.52
20- 30	11	14.47
30- 40	14	18.42
40- 50	4	5.26
50- 60	9	11.24
60- 70	5	6.57
70- 80	5	6.57
80- 90	7	9.21
90-100	3	3.94
100-110	3	3.94
110-120	2	2.63

CUMULATIVE ERRORS RUN 14a

Error	Samples LT Error	Percent Samples LT Error
10	5	6.57
20	13	17.10
30	24	31.57
40	38	50.00
50	42	55.26
60	51	67.10
70	56	73.68
80	61	80.26
90	68	89.47
100	71	93.42
110	74	97.36
120	76	100.00

FIXED ROUTE LS RUN 14

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 14b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	3	27.27
2- 3	3	27.27
3- 4	1	9.09
4- 5	2	18.18
7- 8	1	9.09
8- 9	1	9.09

CUMULATIVE ERRORS RUN 14b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	3	27.27
2	3	27.27
3	6	54.55
4	7	63.64
5	9	81.82
6	9	81.82
7	9	81.82
8	10	90.91
9	11	100.00

FIXED ROUTE LS RUN 15

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 15a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	4	5.26
10- 20	8	10.53
20- 30	11	14.47
30- 40	8	10.53
40- 50	14	18.42
50- 60	7	9.21
60- 70	5	6.58
70- 80	2	2.63
80- 90	6	7.89
90- 100	3	3.95
100- 110	5	6.58
110- 120	2	2.63
140- 150	1	1.32

CUMULATIVE ERRORS RUN 15a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	4	5.26
20	12	15.79
30	23	30.26
40	31	40.79
50	45	59.21
60	52	68.42
70	57	75.00
80	59	77.63
90	65	85.53
100	68	89.47
110	73	96.05
120	75	98.68
130	75	98.68
140	75	98.68
150	76	100.00

FIXED ROUTE LS RUN 15

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 15b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	3	20.00
1- 2	2	13.33
2- 3	1	6.67
3- 4	5	33.33
4- 5	2	13.33
5- 6	1	6.67
7- 8	1	6.67

CUMULATIVE ERRORS RUN 15b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	3	20.00
2	5	33.33
3	6	40.00
4	11	73.33
5	13	86.67
6	14	93.33
7	14	93.33
8	15	100.00

FIXED ROUTE LS RUN 16

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 16a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	3	3.95
10- 20	12	15.79
20- 30	12	15.79
30- 40	3	3.95
40- 50	11	14.47
50- 60	10	13.16
60- 70	7	9.21
70- 80	4	5.26
80- 90	8	10.53
90- 100	2	2.63
100- 110	3	3.95
110- 120	1	1.32

CUMULATIVE ERRORS RUN 16a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	3	3.95
20	15	19.74
30	27	35.53
40	30	39.47
50	41	53.95
60	51	67.11
70	58	76.32
80	62	81.58
90	70	92.11
100	72	94.74
110	75	98.68
120	76	100.00

FIXED ROUTE LS RUN 16

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 16b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	1	6.67
1- 2	4	26.67
2- 3	2	13.33
3- 4	2	13.33
4- 5	1	6.67
5- 6	1	6.67
6- 7	1	6.67
7- 8	1	6.67
10- 11	1	6.67
14- 15	1	6.67

CUMULATIVE ERRORS RUN 16b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	1	6.67
2	5	33.33
3	7	46.67
4	9	60.00
5	10	66.67
6	11	73.33
7	12	80.00
8	13	86.67
9	13	86.67
10	13	86.67
11	14	93.33
12	14	93.33
13	14	93.33
14	14	93.33
15	15	100.00

FIXED ROUTE LS RUN 17

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY **RUN 17a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	4	5.26
10- 20	6	7.89
20- 30	17	22.37
30- 40	11	14.47
40- 50	6	7.89
50- 60	3	3.95
60- 70	5	6.58
70- 80	4	5.26
80- 90	10	13.16
90- 100	6	7.89
100- 110	2	2.63
110- 120	2	2.63

CUMULATIVE ERRORS **RUN 17a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	4	5.26
20	10	13.16
30	27	35.53
40	38	50.00
50	44	57.89
60	47	61.84
70	52	68.42
80	56	73.68
90	66	86.84
100	72	94.74
110	74	97.37
120	76	100.00

FIXED ROUTE LS RUN 17

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY **RUN 17b**

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	2	14.29
1- 2	1	7.14
2- 3	4	28.57
4- 5	2	14.29
6- 7	2	14.29
7- 8	1	7.14
8- 9	1	7.14
9- 10	1	7.14

CUMULATIVE ERRORS **RUN 17b**

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	2	14.29
2	3	21.43
3	7	50.00
4	7	50.00
5	9	64.29
6	9	64.29
7	11	78.57
8	12	85.71
9	13	92.86
10	14	100.00

FIXED ROUTE LS RUN 18

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY **RUN 18a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	2	2.67
10- 20	3	4.00
20- 30	12	16.00
30- 40	12	16.00
40- 50	10	13.33
50- 60	9	12.00
60- 70	8	10.67
70- 80	5	6.67
80- 90	3	4.00
90- 100	3	4.00
100- 110	4	5.33
110- 120	1	1.33
120- 130	2	2.67
130- 140	1	1.33

CUMULATIVE ERRORS **RUN 18a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	2	2.67
20	5	6.67
30	17	22.67
40	29	38.67
50	39	52.00
60	48	64.00
70	56	74.67
80	61	81.33
90	64	85.33
100	67	89.33
110	71	94.67
120	72	96.00
130	74	98.67
140	75	100.00

FIXED ROUTE LS RUN 18

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY **RUN 18b**

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	3	20.00
1- 2	2	13.33
2- 3	3	20.00
3- 4	4	26.67
5- 6	1	6.67
8- 9	1	6.67
14- 15	1	6.67

CUMULATIVE ERRORS **RUN 18b**

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	3	20.00
2	5	33.33
3	8	53.33
4	12	80.00
5	12	80.00
6	13	86.67
7	13	86.67
8	13	86.67
9	14	93.33
10	14	93.33
11	14	93.33
12	14	93.33
13	14	93.33
14	14	93.33
15	15	100.00

FIXED ROUTE LS RUN 20

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 20a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
10- 20	3	6.67
20- 30	6	13.33
30- 40	5	11.11
40- 50	10	22.22
50- 60	4	8.89
60- 70	3	6.67
70- 80	4	8.89
80- 90	3	6.67
90- 100	1	2.22
100- 110	2	4.44
110- 120	1	2.22
120- 130	1	2.22
140- 150	1	2.22
160- 170	1	2.22

CUMULATIVE ERRORS RUN 20a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
20	3	6.67
30	9	20.00
40	14	31.11
50	24	53.33
60	28	62.22
70	31	68.89
80	35	77.78
90	38	84.44
100	39	86.67
110	41	91.11
120	42	93.33
130	43	95.56
140	43	95.56
150	44	97.78
160	44	97.78
170	45	100.00

FIXED ROUTE LS RUN 20

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 20b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
1- 2	2	22.22
2- 3	1	11.11
3- 4	1	11.11
4- 5	2	22.22
5- 6	2	22.22
9- 10	1	11.11

CUMULATIVE ERRORS RUN 20b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
2	2	22.22
3	3	33.33
4	4	44.44
5	6	66.67
6	8	88.89
7	8	88.89
8	8	88.89
9	8	88.89
10	9	100.00

FIXED ROUTE LS RUN 21

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 21a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	7	9.59
10- 20	11	15.07
20- 30	13	17.81
30- 40	14	19.18
40- 50	6	8.22
50- 60	8	10.96
60- 70	4	5.48
70- 80	3	4.11
80- 90	1	1.37
90- 100	2	2.74
100- 110	2	2.74
130- 140	1	1.37
140- 150	1	1.37

CUMULATIVE ERRORS RUN 21a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	7	9.59
20	18	24.66
30	31	42.47
40	45	61.64
50	51	69.86
60	59	80.82
70	63	86.30
80	66	90.41
90	67	91.78
100	69	94.52
110	71	97.26
120	71	97.26
130	71	97.26
140	72	98.63
150	73	100.00

FIXED ROUTE LS RUN 21

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 21b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	3	20.00
1- 2	3	20.00
3- 4	3	20.00
4- 5	2	13.33
6- 7	2	13.33
7- 8	1	6.67
10- 11	1	6.67

CUMULATIVE ERRORS RUN 21b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	3	20.00
2	6	40.00
3	6	40.00
4	9	60.00
5	11	73.33
6	11	73.33
7	13	86.67
8	14	93.33
9	14	93.33
10	14	93.33
11	15	100.00

FIXED ROUTE LS RUN 22

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 22a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	5	6.58
10- 20	10	13.16
20- 30	11	14.47
30- 40	10	13.16
40- 50	14	18.42
50- 60	9	11.84
60- 70	6	7.89
70- 80	3	3.95
80- 90	1	1.32
90- 100	2	2.63
100- 110	2	2.63
120- 130	1	1.32
130- 140	1	1.32
150- 160	1	1.32

CUMULATIVE ERRORS RUN 22a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	5	6.58
20	15	19.74
30	26	34.21
40	36	47.37
50	50	65.79
60	59	77.63
70	65	85.53
80	68	89.47
90	69	90.79
100	71	93.42
110	73	96.05
120	73	96.05
130	74	97.37
140	75	98.68
150	75	98.68
160	76	100.00

FIXED ROUTE LS RUN 22

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 22b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	3	20.00
1- 2	3	20.00
2- 3	3	20.00
3- 4	3	20.00
6- 7	1	6.67
7- 8	1	6.67
9- 10	1	6.67

CUMULATIVE ERRORS RUN 22b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	3	20.00
2	6	40.00
3	9	60.00
4	12	80.00
5	12	80.00
6	12	80.00
7	13	86.67
8	14	93.33
9	14	93.33
10	15	100.00

FIXED ROUTE LS RUN 23

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY **RUN 23a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	6	7.89
10- 20	10	13.16
20- 30	16	21.05
30- 40	8	10.53
40- 50	10	13.16
50- 60	7	9.21
60- 70	6	7.89
70- 80	1	1.32
80- 90	2	2.63
90- 100	4	5.26
110- 120	1	1.32
120- 130	1	1.32
130- 140	1	1.32
140- 150	2	2.63
170- 180	1	1.32

CUMULATIVE ERRORS **RUN 23a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	6	7.89
20	16	21.05
30	32	42.11
40	40	52.63
50	50	65.79
60	57	75.00
70	63	82.89
80	64	84.21
90	66	86.84
100	70	92.11
110	70	92.11
120	71	93.42
130	72	94.74
140	73	96.05
150	75	98.68
160	75	98.68
170	75	98.68
180	76	100.00

FIXED ROUTE LS RUN 23

TIMEPOINT ERROR IN SECONDS

```
ERROR FREQUENCY DENSITY  RUN 23b

  ERROR       NO. OF     PERCENT OF
INTERVAL     SAMPLES      SAMPLES

   0-    1       5         33.33
   1-    2       1          6.67
   2-    3       2         13.33
   3-    4       1          6.67
   4-    5       2         13.33
   6-    7       2         13.33
   7-    8       1          6.67
   8-    9       1          6.67
```

```
CUMULATIVE ERRORS  RUN 23b

ERROR    NO. OF SAMPLES    PERCENT OF SAMPLES
            LT ERROR            LT ERROR

    1          5                 33.33
    2          6                 40.00
    3          8                 53.33
    4          9                 60.00
    5         11                 73.33
    6         11                 73.33
    7         13                 86.67
    8         14                 93.33
    9         15                100.00
```

FIXED ROUTE LS RUN 24

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 24a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	1	1.61
10- 20	7	11.29
20- 30	9	14.52
30- 40	13	20.97
40- 50	5	8.06
50- 60	9	14.52
60- 70	4	6.45
70- 80	2	3.23
80- 90	2	3.23
90- 100	1	1.61
100- 110	2	3.23
120- 130	1	1.61
130- 140	2	3.23
140- 150	2	3.23
170- 180	1	1.61
1500-1510	1	1.61

CUMULATIVE ERRORS RUN 24a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	1	1.61
20	8	12.90
30	17	27.42
40	30	48.39
50	35	56.45
60	44	70.97
70	48	77.42
80	50	80.65
90	52	83.87
100	53	85.48
110	55	88.71
120	55	88.71
130	56	90.32
140	58	93.55
150	60	96.77
160	60	96.77
170	60	96.77
180	61	98.39
1510	62	100.00

MANUALLY PROCESSED FIXED ROUTE LS ERRORS, RUN 24

FIXED ROUTE RUN# CHECKPOINT ERRORS

CP#	X(CP)	Y(CP)	SP#	SEG.	INCREM	COMP X	COMP Y	ERROR
64	13372	4812	12	38	1400	13379	4869	57
65	13787	4668	12	39	399	13753	4652	38
66	14242	4594	12	39	867	14217	4587	26
67	15770	4381	13	40	1408	15782	4386	13
68	16152	4347	13	40	1770	16141	4341	13
69	17121	4202	13	40	2740	17104	4219	24
70	17491	3736	13	41	449	17490	3723	13
71	18691	3072	14	43	1256	18675	3071	16
72	18782	3565	14	44	489	18809	3557	28
73	14484	4477	14	45	422	18495	4486	14
74	17621	4597	14	45	1328	17595	4592	26
75	16706	4705	14	45	2220	16709	4695	10
76	15624	4856	15	46	448	15629	4834	23

FIXED ROUTE LOCATION SUBSYSTEM ERROR STATISTICS, RUN 24

ERROR FREQUENCY DENSITY RUN 24a

Error Interval	No. Samples	Percent of Samples
0- 10	1	1.61
10- 20	13	17.33
20- 30	14	18.66
30- 40	14	18.66
40- 50	5	8.06
50- 60	10	13.33
60- 70	4	6.45
70- 80	2	3.23
80- 90	2	3.23
90-100	1	1.61
100-110	2	3.23
120-130	1	1.61
130-140	2	3.23
140-150	2	3.23
170-180	1	1.61
1500-1510	1	1.61

Cumulative Errors Run 24a

Error	Samples LT Error	Percent Samples LT Error
10	1	1.61
20	14	17.33
30	28	37.33
40	42	56.00
50	47	62.66
60	57	76.00
70	61	81.33
80	63	84.00
90	65	86.66
100	66	88.00
110	68	90.66
120	68	90.66
130	69	92.00
140	71	94.66
150	73	97.33
160	73	97.33
170	73	97.33
180	74	98.66
1510	75	100.00

FIXED ROUTE LS RUN 24
TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 24b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
1- 2	4	33.33
2- 3	1	8.33
3- 4	1	8.33
4- 5	3	25.00
5- 6	2	16.67
12- 13	1	8.33

CUMULATIVE ERRORS RUN 24b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
2	4	33.33
3	5	41.67
4	6	50.00
5	9	75.00
6	11	91.67
7	11	91.67
8	11	91.67
9	11	91.67
10	11	91.67
11	11	91.67
12	11	91.67
13	12	100.00

FIXED ROUTE LS RUN 25

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY **RUN 25a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
.0- 10	1	4.00
10- 20	2	8.00
20- 30	5	20.00
30- 40	1	4.00
40- 50	5	20.00
50- 60	4	16.00
60- 70	3	12.00
70- 80	1	4.00
80- 90	1	4.00
90- 100	2	8.00

CUMULATIVE ERRORS **RUN 25a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	1	4.00
20	3	12.00
30	8	32.00
40	9	36.00
50	14	56.00
60	18	72.00
70	21	84.00
80	22	88.00
90	23	92.00
100	25	100.00

FIXED ROUTE LS RUN 25

TIMEPOINT ERROR IN SECONDS

```
ERROR FREQUENCY DENSITY  RUN 25b

  ERROR       NO. OF      PERCENT OF
INTERVAL     SAMPLES       SAMPLES

   1-   2        1          20.00
   3-   4        1          20.00
   6-   7        2          40.00
   9-  10        1          20.00
```

```
CUMULATIVE ERRORS  RUN 25b

ERROR    NO. OF SAMPLES    PERCENT OF SAMPLES
            LT ERROR            LT ERROR

    2          1                20.00
    3          1                20.00
    4          2                40.00
    5          2                40.00
    6          2                40.00
    7          4                80.00
    8          4                80.00
    9          4                80.00
   10          5               100.00
```

FIXED ROUTE LS RUN 26

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY **RUN 26a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	6	7.89
10- 20	10	13.16
20- 30	17	22.37
30- 40	11	14.47
40- 50	13	17.11
50- 60	7	9.21
60- 70	6	7.89
70- 80	1	1.32
80- 90	1	1.32
90- 100	2	2.63
100- 110	1	1.32
110- 120	1	1.32

CUMULATIVE ERRORS **RUN 26a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	6	7.89
20	16	21.05
30	33	43.42
40	44	57.89
50	57	75.00
60	64	84.21
70	70	92.11
80	71	93.42
90	72	94.74
100	74	97.37
110	75	98.68
120	76	100.00

FIXED ROUTE LS 26

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY **RUN 26b**

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	3	21.43
1- 2	3	21.43
2- 3	2	14.29
3- 4	3	21.43
5- 6	2	14.29
12- 13	1	7.14

CUMULATIVE ERRORS **RUN 26b**

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	3	21.43
2	6	42.86
3	8	57.14
4	11	78.57
5	11	78.57
6	13	92.86
7	13	92.86
8	13	92.86
9	13	92.86
10	13	92.86
11	13	92.86
12	13	92.86
13	14	100.00

FIXED ROUTE LS RUN 27

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 27a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	2	2.63
10- 20	9	11.84
20- 30	11	14.47
30- 40	12	15.79
40- 50	9	11.84
50- 60	14	18.42
60- 70	1	1.32
70- 80	9	11.84
80- 90	3	3.95
90- 100	2	2.63
100- 110	2	2.63
120- 130	2	2.63

CUMULATIVE ERRORS RUN 27a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	2	2.63
20	11	14.47
30	22	28.95
40	34	44.74
50	43	56.58
60	57	75.00
70	58	76.32
80	67	88.16
90	70	92.11
100	72	94.74
110	74	97.37
120	74	97.37
130	76	100.00

FIXED ROUTE LS RUN 27

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 27b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	2	13.33
1- 2	4	26.67
2- 3	3	20.00
3- 4	3	20.00
5- 6	1	6.67
9- 10	1	6.67
14- 15	1	6.67

CUMULATIVE ERRORS RUN 27b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	2	13.33
2	6	40.00
3	9	60.00
4	12	80.00
5	12	80.00
6	13	86.67
7	13	86.67
8	13	86.67
9	13	86.67
10	14	93.33
11	14	93.33
12	14	93.33
13	14	93.33
14	14	93.33
15	15	100.00

FIXED ROUTE LS RUN 28

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY **RUN 28a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	5	6.67
10- 20	10	13.33
20- 30	11	14.67
30- 40	8	10.67
40- 50	13	17.33
50- 60	5	6.67
60- 70	8	10.67
70- 80	5	6.67
80- 90	5	6.67
90- 100	2	2.67
100- 110	2	2.67
110- 120	1	1.33

CUMULATIVE ERRORS **RUN 28a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	5	6.67
20	15	20.00
30	26	34.67
40	34	45.33
50	47	62.67
60	52	69.33
70	60	80.00
80	65	86.67
90	70	93.33
100	72	96.00
110	74	98.67
120	75	100.00

FIXED ROUTE LS RUN 28

TIMEPOINT ERROR IN SECONDS

```
ERROR FREQUENCY DENSITY RUN 28b

 ERROR       NO. OF     PERCENT OF
INTERVAL    SAMPLES      SAMPLES

  0-   1       5          33.33
  1-   2       2          13.33
  2-   3       1           6.67
  3-   4       2          13.33
  4-   5       2          13.33
  5-   6       2          13.33
  9-  10       1           6.67
```

```
CUMULATIVE ERRORS RUN 28b

ERROR   NO. OF SAMPLES   PERCENT OF SAMPLES
           LT ERROR           LT ERROR

    1          5                33.33
    2          7                46.67
    3          8                53.33
    4         10                66.67
    5         12                80.00
    6         14                93.33
    7         14                93.33
    8         14                93.33
    9         14                93.33
   10         15               100.00
```

FIXED ROUTE LS RUN 29

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY **RUN 29a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	4	5.41
10- 20	10	13.51
20- 30	11	14.86
30- 40	15	20.27
40- 50	9	12.16
50- 60	6	8.11
60- 70	8	10.81
70- 80	1	1.35
80- 90	5	6.76
90- 100	3	4.05
100- 110	1	1.35
120- 130	1	1.35

CUMULATIVE ERRORS **RUN 29a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	4	5.41
20	14	18.92
30	25	33.78
40	40	54.05
50	49	66.22
60	55	74.32
70	63	85.14
80	64	86.49
90	69	93.24
100	72	97.30
110	73	98.65
120	73	98.65
130	74	100.00

FIXED ROUTE LS RUN 29
TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY **RUN 29b**

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	4	26.67
1- 2	2	13.33
2- 3	1	6.67
3- 4	1	6.67
4- 5	1	6.67
5- 6	1	6.67
6- 7	2	13.33
7- 8	1	6.67
8- 9	1	6.67
11- 12	1	6.67

CUMULATIVE ERRORS **RUN 29b**

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	4	26.67
2	6	40.00
3	7	46.67
4	8	53.33
5	9	60.00
6	10	66.67
7	12	80.00
8	13	86.67
9	14	93.33
10	14	93.33
11	14	93.33
12	15	100.00

FIXED ROUTE LS RUN 30

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 30a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	3	3.95
10- 20	10	13.16
20- 30	12	15.79
30- 40	9	11.84
40- 50	11	14.47
50- 60	13	17.11
60- 70	7	9.21
70- 80	5	6.58
80- 90	3	3.95
100- 110	2	2.63
120- 130	1	1.32

CUMULATIVE ERRORS RUN 30a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	3	3.95
20	13	17.11
30	25	32.89
40	34	44.74
50	45	59.21
60	58	76.32
70	65	85.53
80	70	92.11
90	73	96.05
100	73	96.05
110	75	98.68
120	75	98.68
130	76	100.00

FIXED ROUTE LS RUN 30

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 30b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	3	20.00
1- 2	4	26.67
2- 3	1	6.67
3- 4	1	6.67
5- 6	2	13.33
7- 8	1	6.67
8- 9	2	13.33
13- 14	1	6.67

CUMULATIVE ERRORS RUN 30b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	3	20.00
2	7	46.67
3	8	53.33
4	9	60.00
5	9	60.00
6	11	73.33
7	11	73.33
8	12	80.00
9	14	93.33
10	14	93.33
11	14	93.33
12	14	93.33
13	14	93.33
14	15	100.00

FIXED ROUTE LS RUN 31

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY **RUN 31a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	2	2.63
10- 20	4	5.26
20- 30	12	15.79
30- 40	15	19.74
40- 50	10	13.16
50- 60	4	5.26
60- 70	9	11.84
70- 80	3	3.95
80- 90	7	9.21
90- 100	5	6.58
100- 110	2	2.63
110- 120	1	1.32
120- 130	1	1.32
400- 410	1	1.32

CUMULATIVE ERRORS **RUN 31a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	2	2.63
20	6	7.89
30	18	23.68
40	33	43.42
50	43	56.58
60	47	61.84
70	56	73.68
80	59	77.63
90	66	86.84
100	71	93.42
110	73	96.05
120	74	97.37
130	75	98.68
410	76	100.00

FIXED ROUTE LS RUN 31

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 31b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	5	33.33
1- 2	1	6.67
2- 3	1	6.67
3- 4	2	13.33
4- 5	1	6.67
5- 6	3	20.00
6- 7	1	6.67
10- 11	1	6.67

CUMULATIVE ERRORS RUN 31b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	5	33.33
2	6	40.00
3	7	46.67
4	9	60.00
5	10	66.67
6	13	86.67
7	14	93.33
8	14	93.33
9	14	93.33
10	14	93.33
11	15	100.00

FIXED ROUTE LS RUN 32

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 32a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	5	6.67
10- 20	11	14.67
20- 30	10	13.33
30- 40	16	21.33
40- 50	9	12.00
50- 60	8	10.67
60- 70	4	5.33
70- 80	3	4.00
80- 90	3	4.00
90- 100	4	5.33
100- 110	1	1.33
120- 130	1	1.33

CUMULATIVE ERRORS RUN 32a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	5	6.67
20	16	21.33
30	26	34.67
40	42	56.00
50	51	68.00
60	59	78.67
70	63	84.00
80	66	88.00
90	69	92.00
100	73	97.33
110	74	98.67
120	74	98.67
130	75	100.00

FIXED ROUTE LS RUN 32

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 32b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	2	14.29
1- 2	2	14.29
2- 3	3	21.43
5- 6	2	14.29
6- 7	1	7.14
8- 9	1	7.14
9- 10	1	7.14
11- 12	1	7.14
12- 13	1	7.14

CUMULATIVE ERRORS RUN 32b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	2	14.29
2	4	28.57
3	7	50.00
4	7	50.00
5	7	50.00
6	9	64.29
7	10	71.43
8	10	71.43
9	11	78.57
10	12	85.71
11	12	85.71
12	13	92.86
13	14	100.00

FIXED ROUTE LS RUN 34

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 34a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
10- 20	3	8.11
20- 30	6	16.22
30- 40	5	13.51
40- 50	6	16.22
50- 60	3	8.11
60- 70	5	13.51
70- 80	3	8.11
80- 90	2	5.41
90- 100	3	8.11
130- 140	1	2.70

CUMULATIVE ERRORS RUN 34a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
20	3	8.11
30	9	24.32
40	14	37.84
50	20	54.05
60	23	62.16
70	28	75.68
80	31	83.78
90	33	89.19
100	36	97.30
110	36	97.30
120	36	97.30
130	36	97.30
140	37	100.00

MANUALLY PROCESSED FIXED ROUTE LS ERRORS, RUN 34

CP#	X(CP)	Y(CP)	SP#	SEG.	INCREM	COMP X	COMP Y	ERROR
38	16908	5840	8	25	1751	16905	5830	10
39	16427	5897	8	25	2253	16407	5893	20
40	15645	6003	8	25	3043	15624	5993	23
41	14638	6127	9	29	351	14637	6119	8
42	14717	5780	9	30	160	14754	5771	38
43	14816	5222	9	31	552	14821	5210	13
44	14055	5037	9	32	705	14089	5045	35
45	13388	5138	9	32	1373	13427	5132	39
46	12862	5200	9	32	1951	12854	5207	11
47	11518	5369	10	33	818	11535	5387	25
48	10787	5472	10	33	1550	10810	5488	28
49	10462	5513	10	33	1892	10471	5535	24
51	8740	5757	10	33	3628	8752	5775	22
52	8145	5840	10	33	4280	8106	5865	46
53	7537	6481	11	35	526	7558	6443	43
54	7652	6971	11	35	1028	7643	6937	35
55	8320	6948	11	36	611	8266	6955	54
56	9345	6825	11	36	1651	9297	6819	93
57	9894	6731	11	36	2213	9854	6745	42
58	12136	6444	12	37	1168	12118	6446	18
59	12561	6405	12	37	1574	12521	6393	42
60	13099	6331	12	37	2154	13096	6318	13
61	13452	6271	12	37	2490	13429	6274	23
62	13455	5695	12	38	510	13497	5751	70
63	13388	5138	12	38	1078	13422	5188	60
64	13372	4812	12	38	1372	13383	4896	85
65	13787	4668	12	39	375	13729	4655	59
66	14242	4594	12	39	821	14171	4594	71
67	15770	4381	13	40	1516	15889	4373	119
68	16152	4347	13	40	1772	16143	4341	11
69	17121	4202	13	40	2724	17088	4221	38
70	17491	3736	13	41	416	17494	3750	14
71	18691	3072	14	43	1230	18650	3074	41
72	18782	3565	14	44	477	18808	3537	38
73	18484	4477	14	45	412	18505	4485	22
74	17621	4597	14	45	1316	17607	4590	16
75	16706	4705	14	45	2220	16709	4695	115
76	15624	4856	15	46	430	15646	4831	33

FIXED ROUTE LOCATION SUBSYSTEM
ERROR STATISTICS, RUN 34a

ERROR FREQUENCY DENSITY RUN 34a

Error Interval	No. Samples	Percent of Samples
0- 10	1	1.33
10- 20	11	14.66
20- 30	14	18.66
30- 40	12	16.00
40- 50	11	14.66
50- 60	5	6.66
60- 70	6	8.0
70- 80	5	6.66
80- 90	3	4.0
90-100	4	5.33
110-120	2	2.66
130-140	1	1.33

Cumulative Errors Run 34a

Error	Samples LT Error	Percent Samples LT Error
10	1	1.33
20	12	16.00
30	26	34.66
40	38	50.66
50	49	65.33
60	54	72.00
70	60	80.00
80	65	86.66
90	68	90.66
100	72	96.00
110	72	96.00
120	74	98.66
130	74	98.66
140	75	100.00

FIXED ROUTE LS RUN 34

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY 34b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	2	25.00
1- 2	1	12.50
4- 5	1	12.50
7- 8	1	12.50
8- 9	1	12.50
9- 10	1	12.50
17- 18	1	12.50

CUMULATIVE ERRORS 34b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	2	25.00
2	3	37.50
3	3	37.50
4	3	37.50
5	4	50.00
6	4	50.00
7	4	50.00
8	5	62.50
9	6	75.00
10	7	87.50
11	7	87.50
12	7	87.50
13	7	87.50
14	7	87.50
15	7	87.50
16	7	87.50
17	7	87.50
18	8	100.00

FIXED ROUTE LS RUN 35

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY **RUN 35a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	6	8.00
10- 20	10	13.33
20- 30	15	20.00
30- 40	10	13.33
40- 50	9	12.00
50- 60	7	9.33
60- 70	9	12.00
70- 80	3	4.00
80- 90	3	4.00
90- 100	2	2.67
130- 140	1	1.33

CUMULATIVE ERRORS **RUN 35a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	6	8.00
20	16	21.33
30	31	41.33
40	41	54.67
50	50	66.67
60	57	76.00
70	66	88.00
80	69	92.00
90	72	96.00
100	74	98.67
110	74	98.67
120	74	98.67
130	74	98.67
140	75	100.00

FIXED ROUTE LS RUN 35

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY **RUN 35b**

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	2	13.33
1- 2	3	20.00
2- 3	3	20.00
5- 6	3	20.00
6- 7	2	13.33
9- 10	2	13.33

CUMULATIVE ERRORS **RUN 35b**

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	2	13.33
2	5	33.33
3	8	53.33
4	8	53.33
5	8	53.33
6	11	73.33
7	13	86.67
8	13	86.67
9	13	86.67
10	15	100.00

FIXED ROUTE LS RUN 36

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 36a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	6	7.89
10- 20	6	7.89
20- 30	13	17.11
30- 40	9	11.84
40- 50	9	11.84
50- 60	7	9.21
60- 70	7	9.21
70- 80	6	7.89
80- 90	5	6.58
100- 110	2	2.63
110- 120	3	3.95
120- 130	1	1.32
130- 140	1	1.32
150- 160	1	1.32

CUMULATIVE ERRORS RUN 36a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	6	7.89
20	12	15.79
30	25	32.89
40	34	44.74
50	43	56.58
60	50	65.79
70	57	75.00
80	63	82.89
90	68	89.47
100	68	89.47
110	70	92.11
120	73	96.05
130	74	97.37
140	75	98.68
150	75	98.68
160	76	100.00

FIXED ROUTE LS RUN 36

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY **RUN 36b**

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	2	13.33
1- 2	3	20.00
2- 3	3	20.00
3- 4	1	6.67
4- 5	5	33.33
7- 8	1	6.67

CUMULATIVE ERRORS **RUN 36b**

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	2	13.33
2	5	33.33
3	8	53.33
4	9	60.00
5	14	93.33
6	14	93.33
7	14	93.33
8	15	100.00

FIXED ROUTE LS RUN 37

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 37a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	5	6.58
10- 20	4	5.26
20- 30	16	21.05
30- 40	7	9.21
40- 50	9	11.84
50- 60	7	9.21
60- 70	9	11.84
70- 80	3	3.95
80- 90	6	7.89
90- 100	3	3.95
100- 110	2	2.63
110- 120	3	3.95
120- 130	1	1.32
140- 150	1	1.32

CUMULATIVE ERRORS RUN 37a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	5	6.58
20	9	11.84
30	25	32.89
40	32	42.11
50	41	53.95
60	48	63.16
70	57	75.00
80	60	78.95
90	66	86.84
100	69	90.79
110	71	93.42
120	74	97.37
130	75	98.68
140	75	98.68
150	76	100.00

FIXED ROUTE LS RUN 37

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 37b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	4	26.67
1- 2	1	6.67
2- 3	2	13.33
3- 4	1	6.67
4- 5	3	20.00
5- 6	1	6.67
7- 8	1	6.67
8- 9	2	13.33

CUMULATIVE ERRORS RUN 37b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	4	26.67
2	5	33.33
3	7	46.67
4	8	53.33
5	11	73.33
6	12	80.00
7	12	80.00
8	13	86.67
9	15	100.00

FIXED ROUTE LS RUN 38

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 38a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	1	1.32
10- 20	10	13.16
20- 30	7	9.21
30- 40	8	10.53
40- 50	10	13.16
50- 60	9	11.84
60- 70	9	11.84
70- 80	5	6.58
80- 90	7	9.21
90- 100	6	7.89
100- 110	2	2.63
110- 120	2	2.63

CUMULATIVE ERRORS RUN 38a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	1	1.32
20	11	14.47
30	18	23.68
40	26	34.21
50	36	47.37
60	45	59.21
70	54	71.05
80	59	77.63
90	66	86.84
100	72	94.74
110	74	97.37
120	76	100.00

FIXED ROUTE LS RUN 38

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 38b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	2	14.29
2- 3	2	14.29
3- 4	1	7.14
4- 5	3	21.43
5- 6	3	21.43
6- 7	1	7.14
10- 11	1	7.14
19- 20	1	7.14

CUMULATIVE ERRORS RUN 38b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	2	14.29
2	2	14.29
3	4	28.57
4	5	35.71
5	8	57.14
6	11	78.57
7	12	85.71
8	12	85.71
9	12	85.71
10	12	85.71
11	13	92.86
20	14	100.00

FIXED ROUTE LS RUN 39

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 39a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
10- 20	2	2.78
20- 30	7	9.72
30- 40	11	15.28
40- 50	16	22.22
50- 60	13	18.06
60- 70	9	12.50
70- 80	4	5.56
80- 90	3	4.17
90- 100	1	1.39
100- 110	3	4.17
110- 120	1	1.39
130- 140	1	1.39
140- 150	1	1.39

CUMULATIVE ERRORS RUN 39a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
20	2	2.78
30	9	12.50
40	20	27.78
50	36	50.00
60	49	68.06
70	58	80.56
80	62	86.11
90	65	90.28
100	66	91.67
110	69	95.83
120	70	97.22
130	70	97.22
140	71	98.61
150	72	100.00

FIXED ROUTE LS RUN 39

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 39b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	1	7.14
1- 2	4	28.57
2- 3	1	7.14
4- 5	2	14.29
5- 6	1	7.14
6- 7	2	14.29
9- 10	1	7.14
11- 12	2	14.29

CUMULATIVE ERRORS RUN 39b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	1	7.14
2	5	35.71
3	6	42.86
4	6	42.86
5	8	57.14
6	9	64.29
7	11	78.57
8	11	78.57
9	11	78.57
10	12	85.71
11	12	85.71
12	14	100.00

FIXED ROUTE LS RUN 40

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 40a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	1	2.78
10- 20	1	2.78
20- 30	2	5.56
30- 40	8	22.22
40- 50	9	25.00
50- 60	7	19.44
70- 80	4	11.11
80- 90	1	2.78
90- 100	1	2.78
100- 110	1	2.78
110- 120	1	2.78

CUMULATIVE ERRORS RUN 40a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	1	2.78
20	2	5.56
30	4	11.11
40	12	33.33
50	21	58.33
60	28	77.78
70	28	77.78
80	32	88.89
90	33	91.67
100	34	94.44
110	35	97.22
120	36	100.00

MANUALLY PROCESSED FIXED ROUTE LS DATA, RUN 40

FIXED ROUTE RUN# 40 CHECKPOINT ERRORS

CP#	X(CP)	Y(CP)	SP#	SEG.	INCREM	COMP X	COMP Y	ERROR
37	17779	5728	8	25	1804	17758	5720	22
38	16908	5840	8	25	2670	16899	5829	14
39	16427	5897	8	25	3164	16409	5893	18
40	15645	6003	8	25	3960	15699	5994	55
41	14638	6127	9	29	1058	14637	6122	5
42	14717	5780	9	30	1572	14770	5770	54
43	14816	5222	9	31	2252	14820	5202	20
44	14055	5037	9	32	3208	14089	5045	35
45	13388	5138	9	32	3888	13415	5133	27
46	12862	5200	9	32	4450	12858	5207	8
47	11518	5369	10	33	824	11529	5388	22
48	10787	5472	10	33	1562	10798	5490	21
49	10462	5513	10	33	1894	10469	5536	24
50	4558	5647	10	33	2878	9495	5692	68
51	8740	5757	10	33	3634	8746	5776	20
52	8145	5840	10	33	4270	8116	5864	38
53	1537	6481	11	35	866	7553	6415	68
54	7652	6971	11	35	1370	7639	6912	60
55	8320	6948	11	36	2092	8252	6957	69
56	9345	6825	11	36	3124	9275	6822	70
57	9894	6731	11	36	3676	9822	6749	74
58	12136	6444	11	37	5994	12120	6446	16
59	12561	6405	11	37	6388	12511	6395	51
60	13099	6331	11	37	6964	13082	6319	21
61	13452	6271	11	37	7296	13411	6276	41
62	13455	5695	11	38	7940	13499	5770	87
63	13388	5138	11	38	8508	13425	5207	78
64	13372	4812	11	38	8794	13387	4924	113
65	13787	4668	11	39	9362	13703	4659	84
66	14242	4594	11	39	9824	14161	4595	81
67	15770	4381	13	40	1378	15752	4390	20
68	16152	4347	13	40	1772	16144	4341	10
69	17121	4202	13	40	2586	16950	4238	175
70	17491	3956	13	41	3628	17492	3738	2
71	18691	3072	13	43	1494	18638	3075	53
72	18782	3565	13	44	2072	18806	3524	48
73	18484	4477	13	45	3392	18517	4484	34
74	17621	4597	13	45	4286	17619	4589	8
75	16706	4705	13	45	5186	16735	4692	32
76	15624	4856	14	46	440	15636	4833	26

FIXED ROUTE LOCATION SUBSYSTEM
ERROR STATISTICS, RUN 40a

ERROR FREQUENCY DENSITY RUN 40a

Error Interval	No. Samples	Percent of Samples
0- 10	4	5.26
10- 20	6	7.89
20- 30	12	15.78
30- 40	12	15.78
40- 50	11	14.47
50- 60	11	14.47
60- 70	4	5.26
70- 80	7	9.21
80- 90	4	5.26
90-100	1	1.31
100-110	1	1.31
110-120	2	2.63
170-180	1	1.31

Cumulative Errors Run 40a

Error	Samples LT Error	Percent Samples LT Error
10	4	5.26
20	10	13.15
30	22	28.94
40	34	44.73
50	45	59.21
60	56	73.68
70	60	78.94
80	67	88.15
90	71	93.42
100	72	94.73
110	73	96.05
120	75	98.65
180	76	100.00

FIXED ROUTE LS RUN 40

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 40b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	3	37.50
3- 4	1	12.50
6- 7	2	25.00
8- 9	1	12.50
11- 12	1	12.50

CUMULATIVE ERRORS RUN 40b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	3	37.50
2	3	37.50
3	3	37.50
4	4	50.00
5	4	50.00
6	4	50.00
7	6	75.00
8	6	75.00
9	7	87.50
10	7	87.50
11	7	87.50
12	8	100.00

FIXED ROUTE LS RUN 41

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 41a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	7	9.72
10- 20	14	19.44
20- 30	7	9.72
30- 40	9	12.50
40- 50	13	18.06
50- 60	6	8.33
60- 70	11	15.28
70- 80	2	2.78
80- 90	1	1.39
90- 100	1	1.39
110- 120	1	1.39

CUMULATIVE ERRORS RUN 41a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	7	9.72
20	21	29.17
30	28	38.89
40	37	51.39
50	50	69.44
60	56	77.78
70	67	93.06
80	69	95.83
90	70	97.22
100	71	98.61
110	71	98.61
120	72	100.00

FIXED ROUTE LS RUN 41

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 41b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	2	14.29
1- 2	3	21.43
3- 4	3	21.43
4- 5	1	7.14
5- 6	2	14.29
7- 8	1	7.14
8- 9	1	7.14
9- 10	1	7.14

CUMULATIVE ERRORS RUN 41b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	2	14.29
2	5	35.71
3	5	35.71
4	8	57.14
5	9	64.29
6	11	78.57
7	11	78.57
8	12	85.71
9	13	92.86
10	14	100.00

FIXED ROUTE LS RUN 42

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 42a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	4	5.56
10- 20	6	8.33
20- 30	10	13.89
30- 40	9	12.50
40- 50	11	15.28
50- 60	8	11.11
60- 70	7	9.72
70- 80	4	5.56
80- 90	6	8.33
90- 100	3	4.17
100- 110	2	2.78
110- 120	1	1.39
130- 140	1	1.39

CUMULATIVE ERRORS RUN 42a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	4	5.56
20	10	13.89
30	20	27.78
40	29	40.28
50	40	55.56
60	48	66.67
70	55	76.39
80	59	81.94
90	65	90.28
100	68	94.44
110	70	97.22
120	71	98.61
130	71	98.61
140	72	100.00

FIXED ROUTE LS RUN 42

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 42b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	2	14.29
1- 2	2	14.29
2- 3	2	14.29
3- 4	1	7.14
4- 5	4	28.57
5- 6	1	7.14
6- 7	1	7.14
9- 10	1	7.14

CUMULATIVE ERRORS RUN 42b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	2	14.29
2	4	28.57
3	6	42.86
4	7	50.00
5	11	78.57
6	12	85.71
7	13	92.86
8	13	92.86
9	13	92.86
10	14	100.00

FIXED ROUTE LS RUN 43

LOCATION ERROR IN FEET

ERROR FREQUENCY DENSITY RUN 43a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	1	1.72
20- 30	5	8.62
30- 40	5	8.62
40- 50	13	22.41
50- 60	9	15.52
60- 70	2	3.45
70- 80	10	17.24
80- 90	3	5.17
90- 100	5	8.62
100- 110	2	3.45
110- 120	1	1.72
120- 130	1	1.72
140- 150	1	1.72

CUMULATIVE ERRORS RUN 43a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	1	1.72
20	1	1.72
30	6	10.34
40	11	18.97
50	24	41.38
60	33	56.90
70	35	60.34
80	45	77.59
90	48	82.76
100	53	91.38
110	55	94.83
120	56	96.55
130	57	98.28
140	57	98.28
150	58	100.00

MANUALLY PROCESSED FIXED ROUTE LS DATA, RUN 43

FIXED ROUTE RUN# CHECKPOINT ERRORS

CP#	X(CP)	Y(CP)	SP#	SEG.	INCREM	COMP X	COMP Y	ERROR
64	13372	4812	11	38	1272	13396	4995	185
65	13787	4668	11	39	331	13686	4661	101
66	14242	4594	11	39	787	14137	4598	105
67	15770	4281	13	40	1390	15764	4389	10
68	16152	4347	13	40	1782	16153	4339	8
69	17121	4202	13	40	2732	17096	4220	31
70	17491	3736	13	41	432	17629	3735	138
71	18691	3072	14	43	1202	18621	3076	70
72	18782	3565	14	44	435	18803	3495	73
73	14484	4477	14	45	390	18527	4482	43
74	17621	4597	14	45	1264	17658	4584	39
75	16706	4705	14	45	2194	16604	4707	102
76	15624	4856	15	46	426	15650	4831	36

FIXED ROUTE LOCATION SUBSYSTEM
ERROR STATISTICS, RUN 43a

ERROR FREQUENCY DENSITY RUN 43a

Error Interval	No. Samples	Percent of Samples
0- 10	3	4.0
10- 20	3	4.0
20- 30	6	8.0
30- 40	8	10.66
40- 50	14	18.66
50- 60	9	12.0
60- 70	2	2.66
70- 80	12	16.00
80- 90	3	4.0
90-100	5	6.66
100-110	5	6.66
110-120	1	1.33
120-130	1	1.33
130-140	1	1.33
140-150	1	1.33
180-190	1	1.33

CUMULATIVE ERRORS RUN 43a

Error	Samples LT Error	Percent Samples LT Error
10	3	4.00
20	6	8.00
30	12	16.00
40	20	26.66
50	34	45.33
60	43	57.33
70	45	60.00
80	57	76.00
90	60	80.00
100	65	86.66
110	70	93.33
120	71	94.66
130	72	96.00
140	73	97.33
150	74	98.66
190	75	100.00

FIXED ROUTE LS RUN 43

TIMEPOINT ERROR IN SECONDS

ERROR FREQUENCY DENSITY RUN 43b

ERROR INTERVAL	NO. OF SAMPLES	PERCENT OF SAMPLES
0- 1	1	9.09
1- 2	3	27.27
2- 3	1	9.09
4- 5	1	9.09
5- 6	3	27.27
6- 7	1	9.09
10- 11	1	9.09

CUMULATIVE ERRORS RUN 43b

ERROR	NO. OF SAMPLES LT ERROR	PERCENT OF SAMPLES LT ERROR
1	1	9.09
2	4	36.36
3	5	45.45
4	5	45.45
5	6	54.55
6	9	81.82
7	10	90.91
8	10	90.91
9	10	90.91
10	10	90.91
11	11	100.00

4.2.2 AVM System (Pseudo Checkpoint) Results

This subsection contains a complete output listing of the FRSYS program corresponding to Fixed Route Run 28. This is followed by the error frequency density and cumulative error tabular outputs of FRSYS for all other fixed route runs. Data corresponding to the case of "no communication" errors and to the case in which 5 percent communication errors are simulated are presented. In the cases of Runs 24, 34, 40, and 43, at least three sheets are provided. The first sheet is the results obtained by processing the raw data through FRSYS. The second sheet contains the results computed manually for those pseudo checkpoints which could not be processed by FRSYS due to tape read errors. The third sheet contains the overall resulting error statistics. The last sheet in the sub section contains the results of imposing a 5 percent communication error rate on the manually computed data.

AVM SYSTEM TEST RESULTS, RUN 28

```
RUN # 28      SYSTEM LOCATION ERRORS   (NO COMMUNICATION ERRORS)
PCP   ODOM   TIME     FIFTH STSEG SSG5   AVM X AVM Y REF X REF Y ERROR

   1    396.  0:31.0    394.   3  CP 1   12396  4435 12413  4414    27
   2    556.  0:51.0    554.   3  CP 1   12378  4276 12389  4256    22
   3    994.  1:11.0    998.   4  TA 3   12370  3874 12375  3873     5
   4   1332.  1:31.0   1334.   4  TA 3   12705  3831 12707  3821    10
   5   1664.  1:51.0   1666.   4  CP 2   13035  3787 13027  3775    14
   6   1964.  2:11.0   1968.   4  CP 2   13332  3748 13327  3736    13
   7   2474.  2:31.0   2476.   4  CP 3   13838  3682 13822  3674    17
   8   2970.  2:51.0   2970.   4  CP 3   14330  3618 14312  3613    18
   9   3120.  3:11.0   3122.   4  CP 3   14479  3598 14463  3595    16
  10   3120.  3:31.0   3122.   4  CP 3   14479  3598 14463  3595    16
  11   3356.  3:51.0   3356.   4  CP 3   14713  3568 14695  3566    18
  12   3650.  4:11.0   3652.   5  CP 4   15010  3522 15016  3521     6
  13   3774.  4:31.0   3776.   5  CP 4   15132  3500 15138  3499     6
  14   4128.  4:51.0   4134.   6  TA 4   15240  3771 15242  3788    17
  15   4272.  5:11.0   4278.   6  TA 4   15260  3913 15262  3930    17
  16   4272.  5:31.0   4278.   6  TA 4   15260  3913 15262  3930    17
  17   4524.  5:51.0   4532.   6  CP 5   15295  4163 15305  4237    74
  18   4792.  6:11.0   4802.   6  CP 6   15332  4428 15336  4458    30
  19   5166.  6:31.0   5178.   6  CP 6   15384  4799 15378  4832    33
  20   5166.  6:51.0   5178.   6  CP 6   15384  4799 15378  4832    33
  21   5428.  7:11.0   5438.   6  CP 7   15420  5058 15419  5102    44
  22   5862.  7:31.0   5872.   6  CP 8   15480  5488 15488  5554    66
  23   6236.  7:51.0   6248.   6  CP 8   15532  5858 15537  5926    68
  24   6458.  8:11.0   6468.   6  CP 8   15562  6078 15566  6145    67
  25   6600.  8:31.0   6612.   6  CP 8   15582  6219 15585  6287    68
  26   6670.  8:51.0   6680.   6  CP 8   15592  6288 15593  6355    67
  27   7114.  9:11.0   7124.   6  CP 8   15653  6728 15651  6795    67
  28   7648.  9:31.0   7660.   6  CP 8   15727  7257 15722  7326    69
  29   8178.  9:51.0   8190.   6  CP10   15800  7781 15808  7832    51
  30   8538. 10:11.0   8548.   6  CP11   15850  8138 15856  8176    38
  31   8910. 10:31.0   8922.   7  CP11   15904  8526 15908  8547    21
  32   9316. 10:51.0   9328.   7  CP11   15960  8928 15964  8949    21
  33   9596. 11:11.0   9608.   7  CP11   15999  9206 16003  9226    20
  34   9926. 11:31.0   9938.   7  CP12   16044  9533 16056  9608    75
  35   9934. 11:51.0   9946.   7  CP12   16046  9541 16057  9616    75
  36   9934. 12:11.0   9946.   7  CP12   16046  9541 16057  9616    75
  37  10186. 12:31.0  10194.   8  TA 5   16185  9660 16276  9645    92
  38  10248. 12:51.0  10256.   8  TA 5   16247  9655 16338  9638    92
  39  10660. 13:11.0  10668.   8  CP13   16658  9623 16760  9594   106
  40  11088. 13:31.0  11096.   8  CP14   17085  9590 17172  9564    90
  41  11580. 13:51.0  11588.   8  CP15   17575  9552 17636  9525    66
  42  12068. 14:11.0  12076.   8  CP16   18062  9514 18114  9510    52
  43  12656. 14:31.0  12658.   9  TA 6   18113  8975 18104  8940    36
  44  13172. 14:51.0  13176.   9  CP17   18112  8459 18104  8378    81
  45  13570. 15:11.0  13572.  10  CP18   18094  7965 18061  7980    36
  46  13722. 15:31.0  13724.  10  CP18   18070  7815 18042  7829    31
  47  13722. 15:51.0  13724.  10  CP18   18070  7815 18042  7829    31
  48  13984. 16:11.0  13988.  10  CP18   18028  7556 18007  7567    23
  49  14286. 16:31.0  14292.  10  CP18   17981  7258 17968  7266    15
```

AVM SYSTEM TEST RESULTS, RUN 28 (CONT'D)

PCP	ODOM	TIME	FIFTH	STSEG	SSGS	AVM X	AVM Y	REF X	REF Y	ERROR
50	14740.	16:51.0	14744.	11	CP19	17907	6813	17914	6848	35
51	15040.	17:11.0	15038.	11	TA 7	17609	6849	17668	6844	59
52	15340.	17:31.0	15336.	11	TA 7	17311	6885	17372	6883	61
53	15648.	17:51.0	15636.	11	TA 7	17005	6922	17075	6922	70
54	15938.	18:11.0	15918.	11	TA 7	16717	6957	16795	6959	78
55	16200.	18:31.0	16180.	11	CP20	16457	6988	16490	6998	34
56	16570.	18:51.0	16544.	11	CP20	16090	7033	16129	7042	40
57	16990.	19:11.0	16958.	11	CP20	15673	7083	15718	7091	45
58	17260.	19:31.0	17228.	11	CP20	15404	7116	15450	7123	46
59	17568.	19:51.0	17538.	11	CP20	15099	7153	15142	7160	43
60	17572.	20:11.0	17544.	11	CP20	15095	7153	15136	7161	41
61	17874.	20:31.0	17838.	11	CP21	14795	7189	14842	7195	47
62	18080.	20:51.0	18042.	11	CP21	14590	7214	14639	7218	49
63	18080.	21:11.0	18042.	11	CP21	14590	7214	14639	7218	49
64	18392.	21:31.0	18342.	11	CP21	14281	7252	14341	7253	60
65	18528.	21:51.0	18480.	11	CP22	14145	7268	14154	7270	9
66	18528.	22:11.0	18480.	11	CP22	14145	7268	14154	7270	9
67	18654.	22:31.0	18604.	12	CP22	14058	7276	14030	7281	28
68	19140.	22:51.0	19074.	13	TA 8	13618	7409	13609	7412	9
69	19604.	23:11.0	19538.	13	CP23	13305	7752	13286	7750	19
70	20126.	23:31.0	20060.	14	TA 9	12931	8115	12909	8135	29
71	20214.	23:51.0	20150.	14	TA 9	12865	8173	12841	8194	31
72	20584.	24:11.0	20520.	15	TA10	12591	8421	12661	8354	96
73	20692.	24:31.0	20630.	15	TA10	12511	8494	12579	8428	94
74	20856.	24:51.0	20792.	15	CP24	12391	8605	12435	8560	62
75	21592.	25:11.0	21532.	15	CP24	11850	9104	11894	9065	58
76	22134.	25:31.0	22074.	15	CP25	11451	9471	11493	9437	54
77	22716.	25:51.0	22654.	16	CP25	11078	9892	11065	9828	65
78	23174.	26:11.0	23108.	17	TA11	11171	10238	11173	10111	127
79	23268.	26:31.0	23200.	17	TA11	11229	10312	11199	10199	116
80	23596.	26:51.0	23526.	18	TA12	11551	10278	11529	10277	22
81	23748.	27:11.0	23678.	18	TA12	11701	10258	11680	10255	21
82	24138.	27:31.0	24070.	18	TA12	12088	10207	12068	10198	21
83	24202.	27:51.0	24134.	18	TA12	12152	10198	12131	10189	22
84	24326.	28:11.0	24258.	18	CP26	12274	10182	12286	10166	20
85	24744.	28:31.0	24676.	18	CP26	12689	10127	12700	10104	25
86	24760.	28:51.0	24690.	18	CP26	12705	10125	12714	10101	25
87	25210.	29:11.0	25140.	18	CP27	13151	10066	13170	10046	27
88	25634.	29:31.0	25562.	19	TA13	13136	9685	13142	9650	35
89	25994.	29:51.0	25920.	19	CP28	13081	9329	13085	9263	66
90	26216.	30:11.0	26144.	19	CP28	13047	9110	13052	9041	69
91	26380.	30:31.0	26310.	19	CP29	13021	8948	13027	8901	47
92	26776.	30:51.0	26708.	19	CP29	12960	8557	12957	8509	48
93	26986.	31:11.0	26916.	19	CP29	12928	8349	12921	8304	45
94	27330.	31:31.0	27262.	20	TA14	12902	8006	12900	7971	35
95	27748.	31:51.0	27684.	21	TA15	13083	7757	13028	7765	55
96	27902.	32:11.0	27838.	21	TA15	13236	7734	13180	7742	56
97	27902.	32:31.0	27838.	21	TA15	13236	7734	13180	7742	56
98	28164.	32:51.0	28102.	21	TA15	13495	7695	13441	7702	54
99	28548.	33:11.0	28486.	21	CP30	13875	7638	13768	7654	108
100	28934.	33:31.0	28870.	22	CP30	14200	7595	14149	7609	52
101	29228.	33:51.0	29166.	22	CP30	14492	7560	14443	7575	51
102	29512.	34:11.0	29450.	22	CP30	14774	7526	14725	7541	51
103	29852.	34:31.0	29786.	22	CP30	15111	7486	15059	7502	54

AVM SYSTEM TEST RESULTS, RUN 28 (CONT'D)

```
PCP   ODOM    TIME    FIFTH  STSEG SSG5  AVM X AVM Y REF X REF Y ERROR
104 30368. 34:51.0 30304. 22    CP31  15624  7424 15603  7435    23
105 30852. 35:11.0 30786. 22    CP32  16104  7366 16061  7381    45
106 31354. 35:31.0 31288. 22    CP32  16603  7306 16561  7332    49
107 31640. 35:51.0 31574. 22    CP33  16887  7272 16856  7293    37
108 31752. 36:11.0 31686. 22    CP33  16998  7258 16967  7278    36
109 31752. 36:31.0 31686. 22    CP33  16998  7258 16967  7278    36
110 31924. 36:51.0 31858. 22    CP33  17169  7238 17138  7254    34
111 32160. 37:11.0 32094. 22    CP33  17403  7210 17371  7221    33
112 32470. 37:31.0 32402. 22    CP34  17711  7173 17663  7174    48
113 32936. 37:51.0 32868. 22    CP34  18173  7117 18122  7093    56
114 33484. 38:11.0 33416. 22    CP35  18717  7051 18636  7044    81
115 33624. 38:31.0 33558. 23    CP35  18826  7013 18778  7039    54
116 33740. 38:51.0 33668. 23    TA16  18803  6899 18823  6974    77
117 34198. 39:11.0 34128. 24    TA16  18719  6469 18762  6518    65
118 34368. 39:31.0 34296. 24    TA16  18704  6299 18740  6352    64
119 34858. 39:51.0 34786. 24    TA16  18660  5812 18676  5866    56
120 35202. 40:11.0 35124. 25    TA17  18504  5625 18511  5626     7
121 35426. 40:31.0 35348. 25    CP36  18281  5653 18250  5663    32
122 35722. 40:51.0 35642. 25    CP36  17988  5691 17959  5703    31
123 35792. 41:11.0 35712. 25    CP36  17918  5700 17889  5712    31
124 35792. 41:31.0 35712. 25    CP36  17918  5700 17889  5712    31
125 35842. 41:51.0 35762. 25    CP36  17869  5706 17840  5719    31
126 35842. 42:11.0 35762. 25    CP36  17869  5706 17840  5719    31
127 35986. 42:31.0 35906. 25    CP37  17726  5724 17757  5730    31
128 36236. 42:51.0 36156. 25    CP37  17478  5756 17509  5762    31
129 36352. 43:11.0 36274. 25    CP37  17363  5771 17392  5777    29
130 36722. 43:31.0 36642. 25    CP37  16996  5818 17027  5824    31
131 36762. 43:51.0 36682. 25    CP37  16956  5823 16987  5829    31
132 37194. 44:11.0 37114. 25    CP38  16528  5877 16534  5884     9
133 37224. 44:31.0 37146. 25    CP38  16498  5881 16502  5888     8
134 37348. 44:51.0 37268. 25    CP39  16375  5897 16389  5902    14
135 37676. 45:11.0 37596. 25    CP39  16050  5938 16064  5946    16
136 37676. 45:31.0 37596. 25    CP39  16050  5938 16064  5946    16
137 37676. 45:51.0 37596. 25    CP39  16050  5938 16064  5946    16
138 37716. 46:11.0 37636. 25    CP39  16010  5943 16024  5951    16
139 37764. 46:31.0 37684. 25    CP39  15963  5949 15977  5957    16
140 38118. 46:51.0 38038. 25    CP40  15611  5994 15621  6005    14
141 38118. 47:11.0 38038. 25    CP40  15611  5994 15621  6005    14
142 38304. 47:31.0 38222. 25    CP40  15427  6018 15437  6023    11
143 38390. 47:51.0 38312. 25    CP40  15342  6029 15348  6031     6
144 38390. 48:11.0 38312. 25    CP40  15342  6029 15348  6031     6
145 38390. 48:31.0 38312. 25    CP40  15342  6029 15348  6031     6
146 38522. 48:51.0 38440. 26    TA18  15237  6065 15235  6056     9
147 38712. 49:11.0 38628. 26    TA18  15266  6253 15259  6243    12
148 38856. 49:31.0 38774. 28    TA19  15274  6380 15239  6385    35
149 39000. 49:51.0 38922. 28    TA19  15131  6401 15092  6406    39
150 39438. 50:11.0 39358. 28    TA19  14697  6464 14661  6469    36
151 39682. 50:31.0 39608. 29    TA20  14652  6241 14653  6252    11
152 39736. 50:51.0 39662. 29    TA20  14645  6188 14647  6199    11
153 40088. 51:11.0 40016. 29    TA21  14601  5838 14628  5785    59
154 40512. 51:31.0 40436. 31    TA22  14880  5682 14881  5694    12
155 40870. 51:51.0 40796. 31    TA22  14835  5327 14832  5337    10
156 41076. 52:11.0 41000. 31    CP43  14809  5122 14805  5116     7
157 41196. 52:31.0 41122. 31    CP43  14794  5003 14792  4995     8
```

AVM SYSTEM TEST RESULTS, RUN 28 (CONT'D)

```
FCF   ODOM    TIME    FIFTH  STSEG SSG5   AVM X  AVM Y  REF X  REF Y  ERROR
158 41540.  52:51.0 41460.  32    TA23   14497   4991  14505   4985     10
159 41572.  53:11.0 41494.  32    TA23   14465   4995  14472   4989      9
160 41718.  53:31.0 41640.  32    TA23   14321   5014  14327   5005     10
161 41946.  53:51.0 41864.  32    CP44   14094   5044  14029   5040     65
162 42070.  54:11.0 41990.  32    CP44   13972   5060  13904   5059     68
163 42070.  54:31.0 41990.  32    CP44   13972   5060  13904   5059     68
164 42150.  54:51.0 42070.  32    CP44   13892   5070  13825   5071     67
165 42666.  55:11.0 42586.  32    CP45   13381   5137  13314   5146     67
166 43206.  55:31.0 43124.  32    CP46   12845   5208  12808   5206     37
167 43708.  55:51.0 43628.  33    CP46   12305   5279  12308   5269     10
168 43850.  56:11.0 43768.  33    CP46   12164   5299  12169   5287     13
169 43860.  56:31.0 43780.  33    CP46   12154   5300  12157   5288     12
170 43916.  56:51.0 43836.  33    CP46   12099   5308  12101   5295     13
171 44044.  57:11.0 43962.  33    CP46   11972   5325  11976   5311     14
172 44428.  57:31.0 44350.  33    CP46   11592   5378  11592   5359     19
173 44454.  57:51.0 44376.  33    CP46   11566   5382  11566   5362     20
174 44526.  58:11.0 44448.  33    CP47   11495   5392  11480   5374     23
175 44894.  58:31.0 44814.  33    CP47   11130   5443  11117   5425     22
176 45288.  58:51.0 45210.  33    CP48   10740   5497  10699   5483     43
177 45780.  59:11.0 45702.  33    CP49   10253   5565  10262   5542     24
178 46334.  59:31.0 46256.  33    CP49    9704   5642   9714   5623     21
179 46624.  59:51.0 46546.  33    CP50    9417   5682   9456   5660     44
180 46830.  60:11.0 46752.  33    CP50    9213   5710   9252   5688     44
181 46850.  60:31.0 46772.  33    CP50    9193   5713   9232   5690     45
182 47366.  60:51.0 47290.  33    CP51    8682   5784   8648   5769     37
183 47938.  61:11.0 47862.  33    CP52    8116   5863   8133   5841     27
184 48462.  61:31.0 48386.  34    CP52    7578   5917   7613   5906     36
185 48864.  61:51.0 48782.  35    TA24    7518   6211   7504   6217     15
186 49040.  62:11.0 48960.  35    TA24    7548   6385   7526   6394     23
187 49092.  62:31.0 49012.  35    TA24    7557   6436   7532   6446     26
188 49558.  62:51.0 49478.  35    CP53    7636   6896   7643   6934     38
189 49748.  63:11.0 49662.  36    TA25    7708   7028   7778   7019     70
190 50168.  63:31.0 50084.  36    TA25    8124   6973   8197   6964     73
191 50628.  63:51.0 50544.  36    CP55    8580   6913   8653   6907     73
192 50722.  64:11.0 50638.  36    CP55    8674   6901   8746   6896     72
193 51150.  64:31.0 51066.  36    CP55    9098   6844   9171   6845     73
194 51626.  64:51.0 51542.  36    CP56    9570   6782   9638   6774     68
195 51906.  65:11.0 51822.  36    CP57    9847   6745   9911   6728     66
196 52484.  65:31.0 52404.  36    CP57   10420   6670  10489   6654     70
197 52990.  65:51.0 52908.  36    CP57   10922   6603  10989   6590     68
198 53226.  66:11.0 53146.  37    CP57   11156   6573  11225   6560     70
199 53268.  66:31.0 53186.  37    CP57   11197   6567  11264   6555     68
200 53316.  66:51.0 53234.  37    CP57   11245   6561  11312   6549     68
201 53734.  67:11.0 53650.  37    CP57   11660   6506  11725   6496     65
202 54236.  67:31.0 54154.  37    CP58   12157   6441  12179   6439     22
203 54724.  67:51.0 54640.  37    CP59   12641   6377  12693   6386     52
204 55202.  68:11.0 55118.  37    CP60   13115   6315  13136   6324     22
205 55618.  68:31.0 55534.  37    CP61   13528   6260  13568   6255     40
206 55990.  68:51.0 55902.  38    TA26   13519   5923  13493   5894     38
207 56110.  69:11.0 56024.  38    TA26   13503   5804  13470   5774     44
208 56378.  69:31.0 56290.  38    CP62   13468   5538  13427   5468     81
209 56618.  69:51.0 56530.  38    CP62   13436   5300  13399   5230     79
210 56990.  70:11.0 56900.  38    CP63   13387   4931  13374   4864     68
211 57238.  70:31.0 57154.  39    TA27   13378   4704  13461   4695     83
```

AVM SYSTEM TEST RESULTS, RUN 28 (CONT'D)

PCP	ODOM	TIME	FIFTH	STSEG	SSG5	AVM X	AVM Y	REF X	REF Y	ERROR
212	57488.	70:51.0	57402.	39	TA27	13626	4669	13708	4674	82
213	57604.	71:11.0	57518.	39	CP65	13741	4653	13830	4660	89
214	57980.	71:31.0	57894.	39	CP65	14113	4601	14201	4600	88
215	58400.	71:51.0	58312.	40	CP66	14609	4535	14620	4541	12
216	58436.	72:11.0	58348.	40	CP66	14644	4531	14655	4536	12
217	58436.	72:31.0	58348.	40	CP66	14644	4531	14655	4536	12
218	58766.	72:51.0	58678.	40	CP66	14972	4489	14982	4490	10
219	59318.	73:11.0	59232.	40	CP66	15520	4419	15531	4414	12
220	59510.	73:31.0	59424.	40	CP66	15710	4395	15721	4387	13
221	59724.	73:51.0	59640.	40	CP67	15922	4368	15931	4366	9
222	60140.	74:11.0	60056.	40	CP68	16335	4316	16337	4319	3
223	60334.	74:31.0	60250.	40	CP68	16528	4291	16529	4290	1
224	60724.	74:51.0	60638.	40	CP68	16915	4242	16913	4233	9
225	60852.	75:11.0	60766.	40	CP68	17042	4226	17040	4214	12
226	60908.	75:31.0	60822.	40	CP69	17097	4219	17128	4201	35
227	61318.	75:51.0	61232.	40	CP69	17504	4168	17537	4163	33
228	61348.	76:11.0	61262.	40	CP69	17534	4164	17567	4160	33
229	61692.	76:31.0	61600.	41	TA28	17509	3847	17506	3833	14
230	61764.	76:51.0	61674.	41	TA28	17498	3775	17494	3760	15
231	62166.	77:11.0	62076.	42	CP70	17437	3332	17447	3372	41
232	62470.	77:31.0	62382.	43	TA29	17584	3173	17554	3177	30
233	62698.	77:51.0	62612.	43	TA29	17811	3152	17783	3155	28
234	63026.	78:11.0	62940.	43	TA29	18137	3121	18110	3125	27
235	63188.	78:31.0	63102.	43	TA29	18299	3106	18271	3110	28
236	63486.	78:51.0	63398.	43	TA29	18595	3078	18566	3083	29
237	63770.	79:11.0	63686.	44	TA30	18766	3190	18759	3181	11
238	63938.	79:31.0	63852.	44	TA30	18786	3356	18768	3347	20
239	64138.	79:51.0	64050.	44	TA30	18809	3555	18780	3545	30
240	64428.	80:11.0	64340.	44	CP72	18843	3843	18820	3816	35
241	64806.	80:31.0	64716.	44	CP72	18888	4218	18876	4187	33
242	65110.	80:51.0	65024.	45	TA31	18830	4446	18844	4443	14
243	65444.	81:11.0	65358.	45	TA31	18498	4485	18511	4474	17
244	65636.	81:31.0	65548.	45	CP73	18308	4507	18319	4499	13
245	65940.	81:51.0	65852.	45	CP73	18006	4543	18018	4541	12
246	66294.	82:11.0	66204.	45	CP73	17654	4584	17669	4590	16
247	66514.	82:31.0	66424.	45	CP74	17435	4610	17479	4613	44
248	66772.	82:51.0	66684.	45	CP74	17179	4640	17221	4644	42
249	66772.	83:11.0	66684.	45	CP74	17179	4640	17221	4644	42
250	66828.	83:31.0	66742.	45	CP74	17123	4646	17164	4650	41
251	67270.	83:51.0	67184.	45	CP75	16684	4698	16696	4706	14
252	67560.	84:11.0	67474.	45	CP75	16396	4731	16408	4746	19
253	67686.	84:31.0	67598.	45	CP75	16271	4746	16286	4763	22
254	67688.	84:51.0	67602.	45	CP75	16269	4746	16282	4764	22
255	67972.	85:11.0	67886.	46	CP75	16060	4771	16000	4803	68
256	68128.	85:31.0	68042.	46	CP75	15905	4793	15846	4824	66
257	68128.	85:51.0	68044.	46	CP75	15905	4793	15844	4825	68
258	68128.	86:11.0	68044.	46	CP75	15905	4793	15844	4825	68
259	68452.	86:31.0	68368.	46	CP76	15584	4839	15542	4860	46

AVM SYSTEM TEST RESULTS, RUN 28 (CONT'D)

```
 ERROR FREQUENCY DENSITY                 ERROR FREQUENCY DENSITY

   ERROR      NO.     PERCENT OF          ERROR      NO.     PERCENT OF
 INTERVAL   SAMPLES    SAMPLES          INTERVAL   SAMPLES    SAMPLES

    0-   10    20        7.72              0-   10    20        7.72
   10-   20    53       20.46             10-   20    52       20.08
   20-   30    35       13.51             20-   30    34       13.13
   30-   40    43       16.60             30-   40    43       16.60
   40-   50    27       10.42             40-   50    26       10.04
   50-   60    18        6.95             50-   60    20        7.72
   60-   70    32       12.36             60-   70    33       12.74
   70-   80    15        5.79             70-   80    14        5.41
   80-   90     7        2.70             80-   90     7        2.70
   90-  100     5        1.93             90-  100     5        1.93
  100-  110     2        0.77            100-  110     2        0.77
  110-  120     1        0.39            110-  120     1        0.39
  120-  130     1        0.39            120-  130     2        0.77

CUMULATIVE ERRORS                       CUMULATIVE ERRORS

ERROR # SAMPLES    PERCENT SAMPLES ERROR # SAMPLES     PERCENT SAMPLES
        LT   ERROR        LT ERROR           LT   ERROR        LT ERROR


   10       20           7.72        10       20              7.72
   20       73          28.19        20       72             27.80
   30      108          41.70        30      106             40.93
   40      151          58.30        40      149             57.53
   50      178          68.73        50      175             67.57
   60      196          75.68        60      195             75.29
   70      228          88.03        70      228             88.03
   80      243          93.82        80      242             93.44
   90      250          96.53        90      249             96.14
  100      255          98.46       100      254             98.07
  110      257          99.23       110      256             98.84
  120      258          99.61       120      257             99.23
  130      259         100.00       130      259            100.00
AVERAGE ERROR      =   39.30       AVERAGE ERROR       =   39.85
STANDARD DEVIATION =   25.12       STANDARD DEVIATION =   25.60
```

FIXED ROUTE AVM SYSTEM RUN 11

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 11a

  ERROR       NO.     PERCENT OF
INTERVAL    SAMPLES    SAMPLES

   0-   10    20        6.51
  10-   20    46       14.98
  20-   30    38       12.38
  30-   40    32       10.42
  40-   50    42       13.68
  50-   60    23        7.49
  60-   70    24        7.82
  70-   80    28        9.12
  80-   90    30        9.77
  90-  100     7        2.28
 100-  110     5        1.63
 110-  120     5        1.63
 120-  130     4        1.30
 150-  160     2        0.65
 210-  220     1        0.33
CUMULATIVE ERRORS RUN 11a

ERROR # SAMPLES    PERCENT SAMPLES
        LT   ERROR        LT ERROR

   10        20              6.51
   20        66             21.50
   30       104             33.88
   40       136             44.30
   50       178             57.98
   60       201             65.47
   70       225             73.29
   80       253             82.41
   90       283             92.18
  100       290             94.46
  110       295             96.09
  120       300             97.72
  130       304             99.02
  140       304             99.02
  150       304             99.02
  160       306             99.67
  170       306             99.67
  180       306             99.67
  190       306             99.67
  200       306             99.67
  210       306             99.67
  220       307            100.00
AVERAGE ERROR         =    48.96
STANDARD DEVIATION =       31.68
```

FIXED ROUTE AVM SYSTEM RUN 11
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
  ERROR FREQUENCY DENSITY RUN 11b

   ERROR        NO.     PERCENT OF
  INTERVAL   SAMPLES      SAMPLES

     0-   10    20          6.51
    10-   20    46         14.98
    20-   30    39         12.70
    30-   40    35         11.40
    40-   50    42         13.68
    50-   60    22          7.17
    60-   70    22          7.17
    70-   80    26          8.47
    80-   90    30          9.77
    90-  100     8          2.61
   100-  110     5          1.63
   110-  120     5          1.63
   120-  130     4          1.30
   150-  160     2          0.65
   230-  240     1          0.33

CUMULATIVE ERRORS  RUN 11b

ERROR # SAMPLES    PERCENT SAMPLES
        LT   ERROR         LT ERROR

   10       20              6.51
   20       66             21.50
   30      105             34.20
   40      140             45.60
   50      182             59.28
   60      204             66.45
   70      226             73.62
   80      252             82.08
   90      282             91.86
  100      290             94.46
  110      295             96.09
  120      300             97.72
  130      304             99.02
  140      304             99.02
  150      304             99.02
  160      306             99.67
  240      307            100.00
AVERAGE ERROR        =   48.63
STANDARD DEVIATION =     32.02
```

FIXED ROUTE AVM SYSTEM RUN 12
LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 12a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	8	2.67
10- 20	27	9.00
20- 30	67	22.33
30- 40	26	8.67
40- 50	23	7.67
50- 60	39	13.00
60- 70	33	11.00
70- 80	20	6.67
80- 90	17	5.67
90- 100	15	5.00
100- 110	14	4.67
110- 120	7	2.33
120- 130	2	0.67
130- 140	1	0.33
140- 150	1	0.33

CUMULATIVE ERRORS RUN 12a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	8	2.67
20	35	11.67
30	102	34.00
40	128	42.67
50	151	50.33
60	190	63.33
70	223	74.33
80	243	81.00
90	260	86.67
100	275	91.67
110	289	96.33
120	296	98.67
130	298	99.33
140	299	99.67
150	300	100.00

AVERAGE ERROR = 51.48
STANDARD DEVIATION = 30.28

FIXED ROUTE AVM SYSTEM RUN 12

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 12b

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	10	3.33
10- 20	27	9.00
20- 30	70	23.33
30- 40	26	8.67
40- 50	20	6.67
50- 60	39	13.00
60- 70	33	11.00
70- 80	19	6.33
80- 90	17	5.67
90- 100	14	4.67
100- 110	14	4.67
110- 120	7	2.33
120- 130	2	0.67
130- 140	1	0.33
140- 150	1	0.33

CUMULATIVE ERRORS RUN 12b

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	10	3.33
20	37	12.33
30	107	35.67
40	133	44.33
50	153	51.00
60	192	64.00
70	225	75.00
80	244	81.33
90	261	87.00
100	275	91.67
110	289	96.33
120	296	98.67
130	298	99.33
140	299	99.67
150	300	100.00

AVERAGE ERROR = 50.75
STANDARD DEVIATION = 30.50

FIXED ROUTE AVM SYSTEM RUN 13

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 13 a

  ERROR       NO.     PERCENT OF
INTERVAL   SAMPLES     SAMPLES

   0-   10    10         3.53
  10-   20    58        20.49
  20-   30    23         8.13
  30-   40    42        14.84
  40-   50    43        15.19
  50-   60    25         8.83
  60-   70    15         5.30
  70-   80    17         6.01
  80-   90    22         7.77
  90-  100     9         3.18
 100-  110     4         1.41
 110-  120     2         0.71
 120-  130     5         1.77
 130-  140     4         1.41
 140-  150     2         0.71
 170-  180     1         0.35
 180-  190     1         0.35
```

```
CUMULATIVE ERRORS RUN 13a

ERROR # SAMPLES     PERCENT SAMPLES
         LT   ERROR         LT ERROR

   10        10               3.53
   20        68              24.03
   30        91              32.16
   40       133              47.00
   50       176              62.19
   60       201              71.02
   70       216              76.33
   80       233              82.33
   90       255              90.11
  100       264              93.29
  110       268              94.70
  120       270              95.41
  130       275              97.17
  140       279              98.59
  150       281              99.29
  160       281              99.29
  170       281              99.29
  180       282              99.65
  190       283             100.00
AVERAGE ERROR        =    48.78
STANDARD DEVIATION =    32.74
```

FIXED ROUTE AVM SYSTEM RUN 13

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 13b

  ERROR       NO.     PERCENT OF
INTERVAL    SAMPLES     SAMPLES

   0-   10    10         3.53
  10-   20    59        20.85
  20-   30    22         7.77
  30-   40    42        14.84
  40-   50    41        14.49
  50-   60    25         8.83
  60-   70    15         5.30
  70-   80    18         6.36
  80-   90    22         7.77
  90-  100    10         3.53
 100-  110     4         1.41
 110-  120     2         0.71
 120-  130     5         1.77
 130-  140     4         1.41
 140-  150     2         0.71
 170-  180     1         0.35
 180-  190     1         0.35

CUMULATIVE ERRORS RUN 13b

ERROR # SAMPLES    PERCENT SAMPLES
        LT  ERROR          LT ERROR

  10        10              3.53
  20        69             24.38
  30        91             32.16
  40       133             47.00
  50       174             61.48
  60       199             70.32
  70       214             75.62
  80       232             81.98
  90       254             89.75
 100       264             93.29
 110       268             94.70
 120       270             95.41
 130       275             97.17
 140       279             98.59
 150       281             99.29
 160       281             99.29
 170       281             99.29
 180       282             99.65
 190       283            100.00
AVERAGE ERROR      =    48.98
STANDARD DEVIATION =    32.93
```

FIXED ROUTE AVM SYSTEM RUN 14

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 14a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	9	3.85
10- 20	34	14.53
20- 30	44	18.80
30- 40	33	14.10
40- 50	32	13.68
50- 60	18	7.69
60- 70	17	7.26
70- 80	12	5.13
80- 90	14	5.98
90- 100	11	4.70
100- 110	9	3.85
110- 120	1	0.43

CUMULATIVE ERRORS RUN 14a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	9	3.85
20	43	18.38
30	87	37.18
40	120	51.28
50	152	64.96
60	170	72.65
70	187	79.91
80	199	85.04
90	213	91.03
100	224	95.73
110	233	99.57
120	234	100.00

AVERAGE ERROR = 44.88
STANDARD DEVIATION = 27.13

FIXED ROUTE AVM SYSTEM RUN 14

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 14b

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	9	3.85
10- 20	34	14.53
20- 30	43	18.38
30- 40	33	14.10
40- 50	34	14.53
50- 60	20	8.55
60- 70	15	6.41
70- 80	12	5.13
80- 90	14	5.98
90- 100	10	4.27
100- 110	9	3.85
110- 120	1	0.43

CUMULATIVE ERRORS RUN 14b

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	9	3.85
20	43	18.38
30	86	36.75
40	119	50.85
50	153	65.38
60	173	73.93
70	188	80.34
80	200	85.47
90	214	91.45
100	224	95.73
110	233	99.57
120	234	100.00

AVERAGE ERROR = 44.74
STANDARD DEVIATION = 26.86

FIXED ROUTE AVM SYSTEM RUN 15

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 15a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	9	4.11
10- 20	38	17.35
20- 30	29	13.24
30- 40	38	17.35
40- 50	34	15.53
50- 60	14	6.39
60- 70	17	7.76
70- 80	4	1.83
80- 90	9	4.11
90- 100	7	3.20
100- 110	5	2.28
110- 120	5	2.28
120- 130	8	3.65
130- 140	2	0.91

CUMULATIVE ERRORS RUN 15a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	9	4.11
20	47	21.46
30	76	34.70
40	114	52.05
50	148	67.58
60	162	73.97
70	179	81.74
80	183	83.56
90	192	87.67
100	199	90.87
110	204	93.15
120	209	95.43
130	217	99.09
140	219	100.00

AVERAGE ERROR = 46.14

STANDARD DEVIATION = 31.47

FIXED ROUTE AVM SYSTEM RUN 15

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY   RUN 15b

  ERROR       NO.     PERCENT OF
INTERVAL   SAMPLES     SAMPLES

   0-  10      8        3.65
  10-  20     42       19.18
  20-  30     30       13.70
  30-  40     36       16.44
  40-  50     31       14.16
  50-  60     13        5.94
  60-  70     18        8.22
  70-  80      4        1.83
  80-  90      9        4.11
  90- 100      8        3.65
 100- 110      5        2.28
 110- 120      5        2.28
 120- 130      8        3.65
 130- 140      2        0.91


CUMULATIVE ERRORS   RUN 15b

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR       LT ERROR

  10        8            3.65
  20       50           22.83
  30       80           36.53
  40      116           52.97
  50      147           67.12
  60      160           73.06
  70      178           81.28
  80      182           83.11
  90      191           87.21
 100      199           90.87
 110      204           93.15
 120      209           95.43
 130      217           99.09
 140      219          100.00
AVERAGE ERROR       =   46.05
STANDARD DEVIATION =   31.94
```

FIXED ROUTE AVM SYSTEM RUN 16

LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 16a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	7	3.50
10- 20	41	20.50
20- 30	30	15.00
30- 40	31	15.50
40- 50	31	15.50
50- 60	21	10.50
60- 70	10	5.00
70- 80	8	4.00
80- 90	11	5.50
90- 100	4	2.00
100- 110	3	1.50
120- 130	3	1.50

CUMULATIVE ERRORS RUN 16a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	7	3.50
20	48	24.00
30	78	39.00
40	109	54.50
50	140	70.00
60	161	80.50
70	171	85.50
80	179	89.50
90	190	95.00
100	194	97.00
110	197	98.50
120	197	98.50
130	200	100.00

AVERAGE ERROR = 41.22
STANDARD DEVIATION = 25.23

FIXED ROUTE AVM SYSTEM RUN 16

LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 16b

  ERROR       NO.      PERCENT OF
INTERVAL    SAMPLES     SAMPLES

   0-  10      8         4.00
  10-  20     41        20.50
  20-  30     29        14.50
  30-  40     31        15.50
  40-  50     32        16.00
  50-  60     21        10.50
  60-  70     11         5.50
  70-  80      8         4.00
  80-  90      9         4.50
  90- 100      4         2.00
 100- 110      3         1.50
 120- 130      3         1.50


CUMULATIVE ERRORS RUN 16b

ERROR # SAMPLES    PERCENT SAMPLES
        LT  ERROR        LT ERROR

  10        8              4.00
  20       49             24.50
  30       78             39.00
  40      109             54.50
  50      141             70.50
  60      162             81.00
  70      173             86.50
  80      181             90.50
  90      190             95.00
 100      194             97.00
 110      197             98.50
 120      197             98.50
 130      200            100.00
AVERAGE ERROR        =   40.78
STANDARD DEVIATION =     24.95
```

FIXED ROUTE AVM SYSTEM RUN 17
LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY **RUN 17a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	24	9.20
10- 20	31	11.88
20- 30	49	18.77
30- 40	41	15.71
40- 50	33	12.64
50- 60	10	3.83
60- 70	19	7.28
70- 80	11	4.21
80- 90	16	6.13
90- 100	19	7.28
100- 110	2	0.77
110- 120	3	1.15
120- 130	3	1.15

CUMULATIVE ERRORS **RUN 17a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	24	9.20
20	55	21.07
30	104	39.85
40	145	55.56
50	178	68.20
60	188	72.03
70	207	79.31
80	218	83.52
90	234	89.66
100	253	96.93
110	255	97.70
120	258	98.85
130	261	100.00

AVERAGE ERROR = 43.43
STANDARD DEVIATION = 28.97

FIXED ROUTE AVM SYSTEM RUN 17
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY **RUN 17b**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	23	8.81
10- 20	32	12.26
20- 30	49	18.77
30- 40	41	15.71
40- 50	36	13.79
50- 60	10	3.83
60- 70	18	6.90
70- 80	11	4.21
80- 90	15	5.75
90- 100	17	6.51
100- 110	2	0.77
110- 120	3	1.15
120- 130	3	1.15
2400-2410	1	0.38

CUMULATIVE ERRORS **RUN 17b**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	23	8.81
20	55	21.07
30	104	39.85
40	145	55.56
50	181	69.35
60	191	73.18
70	209	80.08
80	220	84.29
90	235	90.04
100	252	96.55
110	254	97.32
120	257	98.47
130	260	99.62
2410	261	100.00

AVERAGE ERROR = 51.89
STANDARD DEVIATION = 148.85

FIXED ROUTE AVM SYSTEM RUN 18
LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 18a

  ERROR       NO.     PERCENT OF
INTERVAL   SAMPLES     SAMPLES

   0-  10     2          0.69
  10-  20    28          9.69
  20-  30    33         11.42
  30-  40    56         19.38
  40-  50    29         10.03
  50-  60    32         11.07
  60-  70    32         11.07
  70-  80    18          6.23
  80-  90     6          2.08
  90- 100    19          6.57
 100- 110    24          8.30
 110- 120     1          0.35
 120- 130     4          1.38
 130- 140     1          0.35
 140- 150     2          0.69
 300- 310     1          0.35
 330- 340     1          0.35

CUMULATIVE ERRORS   RUN 18a

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR      LT ERROR

   10        2            0.69
   20       30           10.38
   30       63           21.80
   40      119           41.18
   50      148           51.21
   60      180           62.28
   70      212           73.36
   80      230           79.58
   90      236           81.66
  100      255           88.24
  110      279           96.54
  120      280           96.89
  130      284           98.27
  140      285           98.62
  150      287           99.31
  310      288           99.65
  320      288           99.65
  330      288           99.65
  340      289          100.00
AVERAGE ERROR       =   55.91
STANDARD DEVIATION =    37.01
```

FIXED ROUTE AVM SYSTEM RUN 18
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 18b

  ERROR       NO.      PERCENT OF
 INTERVAL   SAMPLES     SAMPLES

    0-  10      3         1.04
   10-  20     29        10.03
   20-  30     32        11.07
   30-  40     58        20.07
   40-  50     29        10.03
   50-  60     29        10.03
   60-  70     33        11.42
   70-  80     18         6.23
   80-  90      6         2.08
   90- 100     19         6.57
  100- 110     23         7.96
  110- 120      1         0.35
  120- 130      4         1.38
  130- 140      1         0.35
  140- 150      2         0.69
  300- 310      1         0.35
  330- 340      1         0.35
CUMULATIVE ERRORS  RUN 18b

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR          LT ERROR

   10        3              1.04
   20       32             11.07
   30       64             22.15
   40      122             42.21
   50      151             52.25
   60      180             62.28
   70      213             73.70
   80      231             79.93
   90      237             82.01
  100      256             88.58
  110      279             96.54
  120      280             96.89
  130      284             98.27
  140      285             98.62
  150      287             99.31
  160      287             99.31
  310      288             99.65
  320      288             99.65
  330      288             99.65
  340      289            100.00
AVERAGE ERROR        =    55.37
STANDARD DEVIATION =      37.12
```

FIXED ROUTE AVM SYSTEM RUN 21

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 21a

 ERROR        NO.     PERCENT OF
INTERVAL    SAMPLES     SAMPLES

   0-   10     26        9.56
  10-   20     48       17.65
  20-   30     62       22.79
  30-   40     46       16.91
  40-   50     12        4.41
  50-   60      9        3.31
  60-   70     12        4.41
  70-   80     17        6.25
  80-   90      7        2.57
  90-  100     12        4.41
 100-  110      2        0.74
 120-  130     10        3.68
 130-  140      5        1.84
 150-  160      1        0.37
 160-  170      3        1.10
CUMULATIVE ERRORS  RUN 21a

ERROR # SAMPLES   PERCENT SAMPLES
          LT  ERROR        LT ERROR

  10        26          9.56
  20        74         27.21
  30       136         50.00
  40       182         66.91
  50       194         71.32
  60       203         74.63
  70       215         79.04
  80       232         85.29
  90       239         87.87
 100       251         92.28
 110       253         93.01
 120       253         93.01
 130       263         96.69
 140       268         98.53
 150       268         98.53
 160       269         98.90
 170       272        100.00
AVERAGE ERROR       =   42.59
STANDARD DEVIATION =   35.55
```

FIXED ROUTE AVM SYSTEM RUN 21

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 21b

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	27	9.93
10- 20	44	16.18
20- 30	62	22.79
30- 40	44	16.18
40- 50	12	4.41
50- 60	11	4.04
60- 70	14	5.15
70- 80	17	6.25
80- 90	8	2.94
90- 100	12	4.41
100- 110	2	0.74
120- 130	10	3.68
130- 140	4	1.47
140- 150	1	0.37
150- 160	1	0.37
160- 170	3	1.10

CUMULATIVE ERRORS RUN 21b

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	27	9.93
20	71	26.10
30	133	48.90
40	177	65.07
50	189	69.49
60	200	73.53
70	214	78.68
80	231	84.93
90	239	87.87
100	251	92.28
110	253	93.01
120	253	93.01
130	263	96.69
140	267	98.16
150	268	98.53
160	269	98.90
170	272	100.00

AVERAGE ERROR = 43.36
STANDARD DEVIATION = 35.76

FIXED ROUTE AVM SYSTEM RUN 22

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY  RUN 22a

 ERROR       NO.     PERCENT OF
INTERVAL   SAMPLES     SAMPLES

   0-   10    16        6.69
  10-   20    37       15.48
  20-   30    46       19.25
  30-   40    31       12.97
  40-   50    28       11.72
  50-   60    18        7.53
  60-   70    15        6.28
  70-   80    14        5.86
  80-   90     9        3.77
  90-  100     6        2.51
 100-  110     3        1.26
 110-  120     4        1.67
 120-  130     2        0.84
 130-  140     8        3.35
 140-  150     2        0.84

CUMULATIVE ERRORS   RUN 22a

ERROR # SAMPLES   PERCENT SAMPLES
          LT  ERROR        LT ERROR

   10       16              6.69
   20       53             22.18
   30       99             41.42
   40      130             54.39
   50      158             66.11
   60      176             73.64
   70      191             79.92
   80      205             85.77
   90      214             89.54
  100      220             92.05
  110      223             93.31
  120      227             94.98
  130      229             95.82
  140      237             99.16
  150      239            100.00
AVERAGE ERROR        =    45.50
STANDARD DEVIATION =    33.20
```

FIXED ROUTE AVM SYSTEM RUN 22

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY  RUN 22b

  ERROR      NO.     PERCENT OF
INTERVAL   SAMPLES    SAMPLES

   0-  10    14        5.86
  10-  20    36       15.06
  20-  30    45       18.83
  30-  40    32       13.39
  40-  50    28       11.72
  50-  60    17        7.11
  60-  70    17        7.11
  70-  80    13        5.44
  80-  90     9        3.77
  90- 100     7        2.93
 100- 110     4        1.67
 110- 120     5        2.09
 120- 130     2        0.84
 130- 140     7        2.93
 140- 150     2        0.84
 150- 160     1        0.42

CUMULATIVE ERRORS  RUN 22b

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR          LT ERROR

   10       14              5.86
   20       50             20.92
   30       95             39.75
   40      127             53.14
   50      155             64.85
   60      172             71.97
   70      189             79.08
   80      202             84.52
   90      211             88.28
  100      218             91.21
  110      222             92.89
  120      227             94.98
  130      229             95.82
  140      236             98.74
  150      238             99.58
  160      239            100.00
AVERAGE ERROR        =   46.87
STANDARD DEVIATION =     33.78
```

FIXED ROUTE AVM SYSTEM RUN 23

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 23a

```
  ERROR      NO.     PERCENT OF
INTERVAL   SAMPLES     SAMPLES

   0-  10    21        8.33
  10-  20    40       15.87
  20-  30    38       15.08
  30-  40    31       12.30
  40-  50    27       10.71
  50-  60    30       11.90
  60-  70    12        4.76
  70-  80    11        4.37
  80-  90     5        1.98
  90- 100    11        4.37
 100- 110     7        2.78
 110- 120     4        1.59
 120- 130     3        1.19
 130- 140     6        2.38
 140- 150     1        0.40
 160- 170     4        1.59
 170- 180     1        0.40
```

CUMULATIVE ERRORS RUN 23a

```
ERROR # SAMPLES    PERCENT SAMPLES
        LT   ERROR        LT ERROR

   10       21              8.33
   20       61             24.21
   30       99             39.29
   40      130             51.59
   50      157             62.30
   60      187             74.21
   70      199             78.97
   80      210             83.33
   90      215             85.32
  100      226             89.68
  110      233             92.46
  120      237             94.05
  130      240             95.24
  140      246             97.62
  150      247             98.02
  160      247             98.02
  170      251             99.60
  180      252            100.00
AVERAGE ERROR         =    47.70
STANDARD DEVIATION =    36.82
```

FIXED ROUTE AVM SYSTEM RUN 23

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

```
 ERROR FREQUENCY DENSITY RUN 23b

   ERROR      NO.     PERCENT OF
 INTERVAL   SAMPLES    SAMPLES

    0-  10    21         8.33
   10-  20    40        15.87
   20-  30    36        14.29
   30-  40    31        12.30
   40-  50    27        10.71
   50-  60    29        11.51
   60-  70    11         4.37
   70-  80    13         5.16
   80-  90     5         1.98
   90- 100    11         4.37
  100- 110     8         3.17
  110- 120     4         1.59
  120- 130     4         1.59
  130- 140     6         2.38
  140- 150     1         0.40
  160- 170     4         1.59
  170- 180     1         0.40
CUMULATIVE ERRORS RUN 23b

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR         LT ERROR

  10        21               8.33
  20        61              24.21
  30        97              38.49
  40       128              50.79
  50       155              61.51
  60       184              73.02
  70       195              77.38
  80       208              82.54
  90       213              84.52
 100       224              88.89
 110       232              92.06
 120       236              93.65
 130       240              95.24
 140       246              97.62
 150       247              98.02
 160       247              98.02
 170       251              99.60
 180       252             100.00
AVERAGE ERROR        =    48.57
STANDARD DEVIATION =    37.28
```

FIXED ROUTE AVM SYSTEM RUN 24

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 24a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	8	4.00
10- 20	27	13.50
20- 30	26	13.00
30- 40	27	13.50
40- 50	24	12.00
50- 60	13	6.50
60- 70	20	10.00
70- 80	13	6.50
80- 90	10	5.00
90- 100	4	2.00
100- 110	9	4.50
110- 120	2	1.00
120- 130	5	2.50
130- 140	1	0.50
140- 150	6	3.00
160- 170	3	1.50
170- 180	2	1.00

CUMULATIVE ERRORS RUN 24a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	8	4.00
20	35	17.50
30	61	30.50
40	88	44.00
50	112	56.00
60	125	62.50
70	145	72.50
80	158	79.00
90	168	84.00
100	172	86.00
110	181	90.50
120	183	91.50
130	188	94.00
140	189	94.50
150	195	97.50
160	195	97.50
170	198	99.00
180	200	100.00

AVERAGE ERROR = 54.80
STANDARD DEVIATION = 38.79

FIXED ROUTE AVM SYSTEM RUN 24
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY  RUN 24b

  ERROR      NO.     PERCENT OF
INTERVAL   SAMPLES    SAMPLES

   0-  10    10        5.00
  10-  20    27       13.50
  20-  30    25       12.50
  30-  40    25       12.50
  40-  50    25       12.50
  50-  60    12        6.00
  60-  70    20       10.00
  70-  80    13        6.50
  80-  90     9        4.50
  90- 100     4        2.00
 100- 110    10        5.00
 110- 120     2        1.00
 120- 130     6        3.00
 130- 140     1        0.50
 140- 150     6        3.00
 160- 170     3        1.50
 170- 180     2        1.00
CUMULATIVE ERRORS RUN 24b

ERROR # SAMPLES   PERCENT SAMPLES
         LT  ERROR        LT ERROR

   10       10             5.00
   20       37            18.50
   30       62            31.00
   40       87            43.50
   50      112            56.00
   60      124            62.00
   70      144            72.00
   80      157            78.50
   90      166            83.00
  100      170            85.00
  110      180            90.00
  120      182            91.00
  130      188            94.00
  140      189            94.50
  150      195            97.50
  160      195            97.50
  170      198            99.00
  180      200           100.00
AVERAGE ERROR        =   55.06
STANDARD DEVIATION =     39.36
```

MANUALLY PROCESSED FIXED ROUTE

RUN # 24 SYSTEM LOCATION ERRORS (NO COMMUNICATION ERRORS)

PCP	ODOM	TIME	FIFTH	STSEG	SSG5	AVM X	AVM Y	REF X	REF Y	ERROR
201	57242	68:08	56318	38	CD62	13398	5007	13388	4987	22
202	57980	68:08	56556	38	CD64	13367	4775	13359	4715	61
203	57808	68:08	56882	39	TA27	13618	4671	13645	4680	29
204	57892	68:27	56966	39	TA27	13702	4659	13728	4673	30
205	58038	68:47	57112	39	CP65	13846	4639	13879	4652	34
206	58488	69:07	57556	39	CP66	14292	4577	14315	4584	24
207	58952	62:27	58018	40	CP66	14776	4514	14773	4520	7
208	59274	69:47	58338	41	CP66	15095	4474	15090	4476	5
209	59400	70:07	58462	41	CP66	15220	4458	15212	4459	8
210	59590	70:27	58650	41	CP66	15409	4434	15399	4433	10
211	59884	70:47	58936	41	CP66	15701	4397	15692	4392	10
212	59898	71:07	58950	41	CP66	15715	4395	15696	4391	19
213	60088	71:27	59134	41	CP67	15903	4371	15913	4368	10
214	60496	71:47	59536	41	CP68	16308	4319	16320	4322	12
215	60910	72:07	59930	41	CP68	16897	4245	16710	4264	188
216	61428	72:27	60472	41	CP69	17233	4203	17286	4187	55
217	61750	72:47	60744	41	CP69	17552	4162	17557	4161	5
218	62136	73:07	61110	41	TA28	17500	3788	17501	3796	8
219	62570	73:27	61542	42	CP70	17429	3380	17448	3381	19
220	62710	73:47	61680	42	CP70	17397	3241	17432	3244	35
221	63068	74:07	62034	43	TA29	17730	3160	17732	3161	2
222	63400	74:27	62354	43	TA29	18060	3129	18051	3131	9
223	63708	74:47	62650	43	TA29	18367	3100	18345	3104	22
224	64086	75:07	63026	43	TA30	18743	3065	18753	3079	17
225	64382	75:27	63322	44	TA30	18786	3349	18771	3375	30
226	64560	75:47	63498	44	TA30	18806	3526	18781	3351	177
227	64560	76:07	63498	44	TA30	18806	3526	18781	3351	177
228	64838	76:27	63772	44	CP72	18839	3801	18819	3812	23
229	65170	76:47	64102	44	CP72	18878	4131	18869	4138	11
230	65504	77:07	64434	45	TA31	18888	4440	18878	4440	10
231	65868	77:27	64798	45	TA31	18527	4482	18516	4474	14
232	65876	77:47	64808	45	TA31	18519	4483	18506	4475	15
233	66264	78:07	65192	45	CP73	18153	4528	18125	4527	8
234	66680	78:27	65606	45	CP73	17720	4577	17715	4584	9
235	67166	78:47	66088	45	CP74	17237	4633	17220	4644	20
236	67710	79:07	66684	45	CP75	16697	4697	16641	4714	59
237	68170	79:27	69088	45	CP75	16240	4750	16240	4770	20
238	68642	79:47	69576	46	CP75	15834	4804	15776	4835	66
239	69056	80:07	67966	46	CP76	15425	4863	15418	4867	8

FIXED ROUTE AVM SYSTEM ERRORS, RUN 24

ERROR FREQUENCY DENSITY RUN 24

Error Interval	No. Samples	Percent of Samples
0- 10	18	7.53
10- 20	38	15.90
20- 30	33	13.81
30- 40	31	12.97
40- 50	24	10.04
50- 60	15	6.28
60- 70	22	9.21
70- 80	13	5.44
80- 90	10	4.18
90-100	4	1.67
100-110	9	3.77
110-120	2	8.37
120-130	5	2.09
130-140	1	0.42
140-150	6	2.51
160-170	3	1.26
170-180	4	1.67
180-190	1	0.42

Cumulative Errors Run 24

Error	Samples LT Error	Percent Samples LT Error
10	18	7.53
20	56	23.43
30	89	37.24
40	120	50.21
50	144	60.25
60	159	66.53
70	181	75.73
80	194	81.17
90	204	85.36
100	208	87.03
110	217	90.79
120	219	91.63
130	224	93.72
140	225	94.14
150	231	96.65
170	234	97.91
180	238	99.58
180-190	239	100.00

RESULT OF MANUAL PROCESSING PCP 77 THROUGH 97 FOR RUN 25 TO CORRECT FOR RECORDING ERROR

PCP	ODOM (PCP)* -ODOM (R1)	INCREM INCREM	SEG STSEG	AVM X	AVM Y	REF X	REF Y	ERROR
76	56	56	17	11098	10144	11129	9961	185
77	464	185	18	11419	10296	11381	10298	38
78	798	519	18	11750	10252	11708	10251	42
79	1168	889	18	12119	10204	12068	10192	52
80	1214	935	18	12164	10198	12113	10148	71
81	1478	1199	18	12427	10163	12405	10106	61
82	1760	1481	18	12701	10126	12680	10087	44
83	1888	1609	18	12834	10109	12807	10047	68
84	2268	12	19	13193	10049	13193	10047	2
85	2652	396	19	13134	9670	13145	9678	14
86	2958	702	19	13087	9367	13094	9322	46
87	3238	982	19	13044	9091	13053	9049	43
88	3536	1280	19	12998	8796	13005	8777	20
89	3792	1536	19	12959	8543	12961	8530	13
90	"	1536	19	12959	8543	12961	8530	13
91	3920	1664	19	12939	8417	12939	8404	13
92	4322	291	20	12903	8017	12902	8003	14
93	4866	314	21	13199	7740	13127	7750	73
94	4986	434	21	13317	7722	13247	7731	71
95	4986	434	21	13317	7722	13247	7731	71
96	5218	666	21	13546	7688	13475	7697	72
97	5586	1034	21	13911	7633	13770	7654	72
98	248	248	22	14230	7592	14197	7604	35

* ODOM (R6) = 23120 feet. A value of 8192 feet was added to the 23120 feet to compensate for the record error.

FIXED ROUTE AVM SYSTEM RUN 25

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 25a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	13	17.11
10- 20	8	10.53
20- 30	10	13.16
30- 40	5	6.58
40- 50	6	7.89
50- 60	6	7.89
60- 70	7	9.21
70- 80	3	3.95
80- 90	8	10.53
90- 100	4	5.26
100- 110	2	2.63
110- 120	1	1.32
120- 130	2	2.63
140- 150	1	1.32

CUMULATIVE ERRORS RUN 25a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	13	17.11
20	21	27.63
30	31	40.79
40	36	47.37
50	42	55.26
60	48	63.16
70	55	72.37
80	58	76.32
90	66	86.84
100	70	92.11
110	72	94.74
120	73	96.05
130	75	98.68
140	75	98.68
150	76	100.00

AVERAGE ERROR = 47.70
STANDARD DEVIATION = 35.05

FIXED ROUTE AVM SYSTEM RUN 25

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 25b

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	15	19.74
10- 20	7	9.21
20- 30	9	11.84
30- 40	5	6.58
40- 50	7	9.21
50- 60	6	7.89
60- 70	6	7.89
70- 80	3	3.95
80- 90	7	9.21
90- 100	4	5.26
100- 110	2	2.63
110- 120	1	1.32
120- 130	2	2.63
130- 140	1	1.32
140- 150	1	1.32

CUMULATIVE ERRORS RUN 25b

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	15	19.74
20	22	28.95
30	31	40.79
40	36	47.37
50	43	56.58
60	49	64.47
70	55	72.37
80	58	76.32
90	65	85.53
100	69	90.79
110	71	93.42
120	72	94.74
130	74	97.37
140	75	98.68
150	76	100.00

AVERAGE ERROR = 47.61

STANDARD DEVIATION = 36.37

FIXED ROUTE AVM SYSTEM RUN 26

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 26a

  ERROR      NO.      PERCENT OF
INTERVAL   SAMPLES     SAMPLES

   0-  10    18         7.56
  10-  20    41        17.23
  20-  30    51        21.43
  30-  40    37        15.55
  40-  50    18         7.56
  50-  60    23         9.66
  60-  70    10         4.20
  70-  80    11         4.62
  80-  90     3         1.26
  90- 100    10         4.20
 100- 110     6         2.52
 110- 120     1         0.42
 180- 190     9         3.78
```

```
CUMULATIVE ERRORS  RUN 26a

ERROR # SAMPLES    PERCENT SAMPLES
        LT  ERROR        LT ERROR

  10        18              7.56
  20        59             24.79
  30       110             46.22
  40       147             61.76
  50       165             69.33
  60       188             78.99
  70       198             83.19
  80       209             87.82
  90       212             89.08
 100       222             93.28
 110       228             95.80
 120       229             96.22
 130       229             96.22
 140       229             96.22
 150       229             96.22
 160       229             96.22
 170       229             96.22
 180       229             96.22
 190       238            100.00
AVERAGE ERROR        =   43.62
STANDARD DEVIATION =     38.03
```

FIXED ROUTE AVM SYSTEM RUN 26
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 26b

 ERROR      NO.     PERCENT OF
INTERVAL  SAMPLES    SAMPLES

   0-  10   16        6.72
  10-  20   39       16.39
  20-  30   50       21.01
  30-  40   40       16.81
  40-  50   19        7.98
  50-  60   23        9.66
  60-  70   11        4.62
  70-  80   11        4.62
  80-  90    3        1.26
  90- 100    9        3.78
 100- 110    7        2.94
 110- 120    1        0.42
 180- 190    9        3.78

CUMULATIVE ERRORS RUN 26b

ERROR # SAMPLES    PERCENT SAMPLES
        LT  ERROR       LT ERROR

   10       16            6.72
   20       55           23.11
   30      105           44.12
   40      145           60.92
   50      164           68.91
   60      187           78.57
   70      198           83.19
   80      209           87.82
   90      212           89.08
  100      221           92.86
  110      228           95.80
  120      229           96.22
  130      229           96.22
  140      229           96.22
  150      229           96.22
  160      229           96.22
  170      229           96.22
  180      229           96.22
  190      238          100.00
AVERAGE ERROR      =   44.30
STANDARD DEVIATION =   37.87
```

FIXED ROUTE AVM SYSTEM RUN 27

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

```
 ERROR FREQUENCY DENSITY RUN 27a

   ERROR       NO.     PERCENT OF
 INTERVAL    SAMPLES     SAMPLES

    0-  10     17         7.08
   10-  20     33        13.75
   20-  30     48        20.00
   30-  40     36        15.00
   40-  50     26        10.83
   50-  60     24        10.00
   60-  70     13         5.42
   70-  80     17         7.08
   80-  90      8         3.33
   90- 100      7         2.92
  100- 110      6         2.50
  110- 120      3         1.25
  120- 130      1         0.42
  210- 220      1         0.42
CUMULATIVE ERRORS RUN 27a

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR        LT ERROR

   10       17             7.08
   20       50            20.83
   30       98            40.83
   40      134            55.83
   50      160            66.67
   60      184            76.67
   70      197            82.08
   80      214            89.17
   90      222            92.50
  100      229            95.42
  110      235            97.92
  120      238            99.17
  130      239            99.58
  140      239            99.58
  150      239            99.58
  160      239            99.58
  170      239            99.58
  180      239            99.58
  190      239            99.58
  200      239            99.58
  210      239            99.58
  220      240           100.00
AVERAGE ERROR       =    43.20
STANDARD DEVIATION  =    28.79
```

FIXED ROUTE AVM SYSTEM RUN 27
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 27b

  ERROR      NO.     PERCENT OF
INTERVAL   SAMPLES     SAMPLES

   0-  10    16        6.67
  10-  20    33       13.75
  20-  30    51       21.25
  30-  40    35       14.58
  40-  50    25       10.42
  50-  60    25       10.42
  60-  70    12        5.00
  70-  80    16        6.67
  80-  90     8        3.33
  90- 100     7        2.92
 100- 110     7        2.92
 110- 120     3        1.25
 120- 130     1        0.42
 210- 220     1        0.42
CUMULATIVE ERRORS RUN 27b

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR       LT ERROR

  10       16           6.67
  20       49          20.42
  30      100          41.67
  40      135          56.25
  50      160          66.67
  60      185          77.08
  70      197          82.08
  80      213          88.75
  90      221          92.08
 100      228          95.00
 110      235          97.92
 120      238          99.17
 130      239          99.58
 140      239          99.58
 150      239          99.58
 160      239          99.58
 170      239          99.58
 180      239          99.58
 190      239          99.58
 200      239          99.58
 210      239          99.58
 220      240         100.00
AVERAGE ERROR      =   43.23
STANDARD DEVIATION =   28.96
```

FIXED ROUTE AVM SYSTEM RUN 28
LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 28a

  ERROR       NO.     PERCENT OF
INTERVAL    SAMPLES     SAMPLES

   0-   10    20          7.72
  10-   20    53         20.46
  20-   30    35         13.51
  30-   40    43         16.60
  40-   50    27         10.42
  50-   60    18          6.95
  60-   70    32         12.36
  70-   80    15          5.79
  80-   90     7          2.70
  90-  100     5          1.93
 100-  110     2          0.77
 110-  120     1          0.39
 120-  130     1          0.39
```

```
CUMULATIVE ERRORS RUN 28a

ERROR # SAMPLES    PERCENT SAMPLES
        LT  ERROR          LT ERROR

   10        20              7.72
   20        73             28.19
   30       108             41.70
   40       151             58.30
   50       178             68.73
   60       196             75.68
   70       228             88.03
   80       243             93.82
   90       250             96.53
  100       255             98.46
  110       257             99.23
  120       258             99.61
  130       259            100.00
AVERAGE ERROR         =    39.30
STANDARD DEVIATION =    25.12
```

FIXED ROUTE AVM SYSTEM RUN 28
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 28b

  ERROR       NO.      PERCENT OF
INTERVAL    SAMPLES      SAMPLES

   0-  10     20          7.72
  10-  20     52         20.08
  20-  30     34         13.13
  30-  40     43         16.60
  40-  50     26         10.04
  50-  60     20          7.72
  60-  70     33         12.74
  70-  80     14          5.41
  80-  90      7          2.70
  90- 100      5          1.93
 100- 110      2          0.77
 110- 120      1          0.39
 120- 130      2          0.77
```

```
CUMULATIVE ERRORS RUN 28b

ERROR # SAMPLES    PERCENT SAMPLES
        LT  ERROR        LT ERROR

  10        20             7.72
  20        72            27.80
  30       106            40.93
  40       149            57.53
  50       175            67.57
  60       195            75.29
  70       228            88.03
  80       242            93.44
  90       249            96.14
 100       254            98.07
 110       256            98.84
 120       257            99.23
 130       259           100.00
AVERAGE ERROR        =   39.85
STANDARD DEVIATION =     25.60
```

FIXED ROUTE AVM SYSTEM RUN 29

LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY  RUN 29a

  ERROR        NO.     PERCENT OF
INTERVAL     SAMPLES    SAMPLES

    0-   10     21        8.05
   10-   20     39       14.94
   20-   30     56       21.46
   30-   40     30       11.49
   40-   50     28       10.73
   50-   60     34       13.03
   60-   70     26        9.96
   70-   80      6        2.30
   80-   90      7        2.68
   90-  100     10        3.83
  100-  110      2        0.77
  120-  130      1        0.38
  160-  170      1        0.38
```

```
CUMULATIVE ERRORS   RUN 29a

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR        LT ERROR

   10       21             8.05
   20       60            22.99
   30      116            44.44
   40      146            55.94
   50      174            66.67
   60      208            79.69
   70      234            89.66
   80      240            91.95
   90      247            94.64
  100      257            98.47
  110      259            99.23
  120      259            99.23
  130      260            99.62
  140      260            99.62
  150      260            99.62
  160      260            99.62
  170      261           100.00
AVERAGE ERROR        =   39.97
STANDARD DEVIATION   =   25.30
```

FIXED ROUTE AVM SYSTEM RUN 29
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY  RUN 29b

  ERROR      NO.     PERCENT OF
INTERVAL   SAMPLES    SAMPLES

   0-  10    22        8.43
  10-  20    40       15.33
  20-  30    54       20.69
  30-  40    30       11.49
  40-  50    27       10.34
  50-  60    36       13.79
  60-  70    25        9.58
  70-  80     5        1.92
  80-  90     7        2.68
  90- 100    10        3.83
 100- 110     3        1.15
 120- 130     1        0.38
 160- 170     1        0.38
```

```
CUMULATIVE ERRORS   RUN 29b

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR         LT ERROR

   10       22              8.43
   20       62             23.75
   30      116             44.44
   40      146             55.94
   50      173             66.28
   60      209             80.08
   70      234             89.66
   80      239             91.57
   90      246             94.25
  100      256             98.08
  110      259             99.23
  120      259             99.23
  130      260             99.62
  140      260             99.62
  150      260             99.62
  160      260             99.62
  170      261            100.00
AVERAGE ERROR      =    40.01
STANDARD DEVIATION =    25.66
```

FIXED ROUTE AVM SYSTEM RUN 30

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 30a

```
  ERROR       NO.     PERCENT OF
INTERVAL    SAMPLES     SAMPLES

   0-  10     14          5.83
  10-  20     40         16.67
  20-  30     29         12.08
  30-  40     31         12.92
  40-  50     32         13.33
  50-  60     34         14.17
  60-  70     17          7.08
  70-  80     22          9.17
  80-  90     11          4.58
  90- 100      2          0.83
 100- 110      5          2.08
 110- 120      2          0.83
 240- 250      1          0.42
```

CUMULATIVE ERRORS RUN 30a

```
ERROR # SAMPLES   PERCENT SAMPLES
         LT  ERROR          LT ERROR

   10        14               5.83
   20        54              22.50
   30        83              34.58
   40       114              47.50
   50       146              60.83
   60       180              75.00
   70       197              82.08
   80       219              91.25
   90       230              95.83
  100       232              96.67
  110       237              98.75
  120       239              99.58
  250       240             100.00
AVERAGE ERROR        =    44.05
STANDARD DEVIATION =    28.19
```

FIXED ROUTE AVM SYSTEM RUN 30
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 30b

  ERROR      NO.     PERCENT OF
INTERVAL   SAMPLES     SAMPLES

   0-  10    15         6.25
  10-  20    39        16.25
  20-  30    27        11.25
  30-  40    34        14.17
  40-  50    31        12.92
  50-  60    33        13.75
  60-  70    18         7.50
  70-  80    20         8.33
  80-  90    11         4.58
  90- 100     3         1.25
 100- 110     6         2.50
 110- 120     2         0.83
 240- 250     1         0.42
CUMULATIVE ERRORS RUN 30b

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR        LT ERROR

   10       15              6.25
   20       54             22.50
   30       81             33.75
   40      115             47.92
   50      146             60.83
   60      179             74.58
   70      197             82.08
   80      217             90.42
   90      228             95.00
  100      231             96.25
  110      237             98.75
  120      239             99.58
  130      239             99.58
  140      239             99.58
  150      239             99.58
  160      239             99.58
  170      239             99.58
  180      239             99.58
  190      239             99.58
  200      239             99.58
  210      239             99.58
  220      239             99.58
  230      239             99.58
  240      239             99.58
  250      240            100.00
AVERAGE ERROR      =    44.26
STANDARD DEVIATION =    28.52
```

FIXED ROUTE AVM SYSTEM RUN 31
LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 31a

  ERROR      NO.    PERCENT OF
INTERVAL   SAMPLES    SAMPLES

   0-   10    17          6.56
  10-   20    23          8.88
  20-   30    40         15.44
  30-   40    43         16.60
  40-   50    46         17.76
  50-   60    17          6.56
  60-   70    19          7.34
  70-   80    16          6.18
  80-   90    13          5.02
  90-  100     7          2.70
 100-  110     2          0.77
 110-  120     1          0.39
 120-  130     4          1.54
 130-  140     2          0.77
 150-  160     1          0.39
 280-  290     2          0.77
 320-  330     2          0.77
 340-  350     1          0.39
 400-  410     3          1.16
CUMULATIVE ERRORS RUN 31a

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR        LT ERROR

   10       17              6.56
   20       40             15.44
   30       80             30.89
   40      123             47.49
   50      169             65.25
   60      186             71.81
   70      205             79.15
   80      221             85.33
   90      234             90.35
  100      241             93.05
  110      243             93.82
  120      244             94.21
  130      248             95.75
  140      250             96.53
  150      250             96.53
  160      251             96.91
  290      253             97.68
  330      255             98.46
  350      256             98.84
  410      259            100.00
AVERAGE ERROR        =    54.62
STANDARD DEVIATION =      59.77
```

FIXED ROUTE AVM SYSTEM RUN 31
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY **RUN 31b**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	18	6.95
10- 20	24	9.27
20- 30	41	15.83
30- 40	42	16.22
40- 50	44	16.99
50- 60	17	6.56
60- 70	18	6.95
70- 80	17	6.56
80- 90	13	5.02
90- 100	7	2.70
100- 110	2	0.77
110- 120	1	0.39
120- 130	4	1.54
130- 140	2	0.77
150- 160	1	0.39
280- 290	2	0.77
320- 330	2	0.77
340- 350	1	0.39
400- 410	3	1.16

CUMULATIVE ERRORS **RUN 31b**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	18	6.95
20	42	16.22
30	83	32.05
40	125	48.26
50	169	65.25
60	186	71.81
70	204	78.76
80	221	85.33
90	234	90.35
100	241	93.05
110	243	93.82
120	244	94.21
130	248	95.75
140	250	96.53
160	251	96.91
290	253	97.68
330	255	98.46
410	259	100.00

AVERAGE ERROR = 54.37
STANDARD DEVIATION = 59.87

FIXED ROUTE AVM SYSTEM RUN 34

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 34a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	8	4.79
10- 20	34	20.36
20- 30	19	11.38
30- 40	26	15.57
40- 50	14	8.38
50- 60	17	10.18
60- 70	14	8.38
70- 80	16	9.58
80- 90	12	7.19
90- 100	4	2.40
140- 150	1	0.60
190- 200	2	1.20

CUMULATIVE ERRORS RUN 34a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	8	4.79
20	42	25.15
30	61	36.53
40	87	52.10
50	101	60.48
60	118	70.66
70	132	79.04
80	148	88.62
90	160	95.81
100	164	98.20
110	164	98.20
120	164	98.20
130	164	98.20
140	164	98.20
150	165	98.80
160	165	98.80
170	165	98.80
180	165	98.80
190	165	98.80
200	167	100.00

AVERAGE ERROR = 45.42
STANDARD DEVIATION = 31.26

FIXED ROUTE AVM SYSTEM RUN 34

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 34b

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	9	5.39
10- 20	34	20.36
20- 30	18	10.78
30- 40	24	14.37
40- 50	15	8.98
50- 60	15	8.98
60- 70	15	8.98
70- 80	18	10.78
80- 90	12	7.19
90- 100	4	2.40
140- 150	1	0.60
190- 200	2	1.20

CUMULATIVE ERRORS RUN 34b

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	9	5.39
20	43	25.75
30	61	36.53
40	85	50.90
50	100	59.88
60	115	68.86
70	130	77.84
80	148	88.62
90	160	95.81
100	164	98.20
110	164	98.20
120	164	98.20
130	164	98.20
140	164	98.20
150	165	98.80
160	165	98.80
170	165	98.80
180	165	98.80
190	165	98.80
200	167	100.00

AVERAGE ERROR = 45.72
STANDARD DEVIATION = 31.56

MANUALLY PROCESSED FIXED ROUTE

RUN # 34 SYSTEM LOCATION ERRORS (NO COMMUNICATION ERRORS)

PCP	ODOM	TIME	FIFTH	STSEG	SSG5	AVM X	AVM Y	REF X	REF Y	ERROR
168	36894	56:28	36524	25	CP37	16947	5824	16982	5831	35
169	36948	56:48	36678	25	CP38	16893	5831	16896	5841	10
170	37264	57:08	36942	25	CP38	16574	5871	16584	5878	12
171	37398	57:28	37076	25	CP38	16417	5892	16451	5894	34
172	37486	57:48	37162	25	CP39	16360	5899	16381	5903	21
173	37848	58:08	37520	25	CP39	16000	5945	16027	5951	28
174	37848	58:28	37522	25	CP39	16000	5945	16025	5952	26
175	38160	58:48	37828	25	CP39	15691	5985	15721	5993	115
176	38294	59:08	37964	25	CP40	15558	6002	15579	6009	22
177	38472	59:28	38138	25	CP40	15382	6024	15406	6026	24
178	38738	59:48	38398	26	TA18	15251	6158	15244	6120	39
179	38856	60:08	38516	27	TA18	15269	6275	15259	6237	39
180	39044	60:28	38708	28	TA19	15225	6388	15196	6392	29
181	39400	60:48	39062	28	TA19	14872	6439	14845	6443	27
182	39620	61:08	39280	29	TA19	14678	6440	14630	6475	57
183	39838	61:28	39500	29	TA20	14650	6224	14708	6257	67
184	39896	61:48	39558	29	TA20	14643	6166	14715	6199	70
185	40206	62:08	39866	29	CP41	14604	5858	14605	5867	9
186	40550	62:28	40206	30	CP42	14866	5760	14826	5766	40
187	40564	62:48	40218	30	CP42	14880	5759	14838	5763	42
188	40640	63:08	40290	31	TA22	14882	5692	14885	5722	30
189	40858	63:28	40506	31	TA22	14854	5476	14856	5508	32
190	41066	63:48	40712	31	TA22	14828	5270	14827	5304	34
191	41204	64:08	40850	31	CP43	14811	5133	14808	5146	13
192	41394	64:28	41038	32	CP43	14779	4954	14789	4959	11
193	41660	64:48	41296	32	TA23	14515	4989	14552	4980	38
194	41736	65:08	41372	32	TA23	14440	4999	14476	4989	37
195	41904	65:28	41536	32	TA23	14273	5021	14313	5007	42
196	42274	65:48	41904	32	CP44	13907	5069	13873	5065	34
197	42674	66:08	42302	32	CP44	13510	5121	13480	5124	30
198	42892	66:28	42516	32	CP45	13294	5149	13259	5153	35
199	43180	66:48	47804	32	CP45	13008	5187	12973	5187	35
200	43194	67:08	42816	32	CP45	12994	5189	12961	5188	33
201	43572	67:28	43188	32	CP46	12620	5238	12634	5229	23
202	44014	67:48	43626	33	CP46	12170	5298	12199	5283	33
203	44440	68:08	44050	33	CP46	11748	5357	11799	5336	37
204	44878	68:28	44486	33	CP47	11315	5418	11322	5469	51
205	45362	68:48	44966	33	CP47	10836	5485	10895	5687	155
206	45836	69:08	45440	33	CP49	10366	5550	10357	5528	24

RUN # 34 SYSTEM LOCATION ERRORS (NO COMMUNICATION ERRORS)

PCP	ODOM	TIME	FIFTH	STSEG	SSG5	AVM X	AVM Y	REF X	REF Y	ERROR
207	46354	69:28	45958	33	CP49	9853	5622	9844	5601	23
208	46970	69:48	46576	33	CP49	9243	5707	9232	5687	23
209	47018	70:08	46624	33	CP49	9196	5713	9185	5694	22
210	47142	70:28	46746	33	CP49	9073	5730	9064	5711	21
211	47600	70:48	47900	33	CP51	8619	5794	8609	5775	21
212	48106	71:08	47708	33	CP51	8118	5864	8106	5845	22
213	48578	71:28	48176	34	CP52	7654	5913	7690	5896	40
214	48696	71:48	48294	34	CP52	7537	5920	7573	5911	37
215	48764	72:08	48358	34	TA24	7469	5924	7470	5930	6
216	49214	72:28	48802	35	TA24	7545	6368	7524	6371	21
217	49718	72:48	49304	35	CP53	7631	6864	7634	6896	32
218	50036	73:08	49612	36	TA25	7804	7016	7848	7010	44
219	50522	73:28	50088	36	CP55	8286	6952	8342	6945	56
220	50880	73:48	50436	36	CP55	8640	6905	8687	6904	47
221	51088	74:08	50644	36	CP55	8847	6878	8894	6879	47
222	51422	74:28	50972	36	CP55	9178	6834	9220	6840	42
223	50694	74:48	51242	36	CP56	9447	6799	9493	6800	46
224	52058	75:08	51596	36	CP56	9800	6751	9842	6740	36
225	52232	75:28	51770	36	CP57	9981	6728	10019	6715	40
226	52662	75:48	52198	36	CP57	10413	6671	10444	6661	33
227	53032	76:08	52566	36	CP57	10774	6624	10809	6614	36
228	53298	76:28	52828	37	CP57	11023	6590	11069	6561	47
229	53750	76:48	53280	37	CP57	11472	6532	11517	6523	46
230	54224	77:08	53750	37	CP57	11942	6470	11983	6464	41
231	54720	77:28	54244	37	CP57	12434	6405	12453	6415	21
232	55220	77:48	54738	37	CP59	12929	6339	12965	6349	37
233	55692	78:08	55208	37	CP60	13397	6277	13248	6306	152
234	56056	78:28	55564	38	TA26	13538	6062	13821	6060	283
235	56338	78:48	55846	38	TA26	13501	5782	13472	5782	29
236	56708	79:08	56224	38	CP62	13452	5416	13347	5351	123
237	57140	79:28	56644	38	CP63	13395	4987	13378	4936	51
238	57278	79:48	56780	38	CP64	13377	4851	13366	4766	86
239	57492	80:08	56996	39	TA27	13426	4697	13428	4698	2
240	57768	80:28	57266	39	TA27	13699	4659	13716	4674	23
241	58016	80:48	57514	39	CP65	13945	4625	13871	4654	79
242	58356	81:08	57848	39	CP66	14276	4579	14349	4579	23
243	58538	81:28	58030	40	CP66	14496	4549	14529	4554	33
244	58696	81:48	58188	40	CP66	14653	4529	14686	4532	33
245	59144	82:08	58632	40	CP66	15097	4474	15125	4471	28
246	59604	82:28	59090	40	CP66	15554	4416	15579	4408	26

RUN # 34 SYSTEM LOCATION ERRORS (NO COMMUNICATION ERRORS)

PCP	ODOM	TIME	FIFTH	STSEG	SSG5	AVM X	AVM Y	REF X	REF Y	ERROR
247	59774	82:48	59260	40	CP66	15722	4394	15747	4384	27
248	59776	83:08	59262	40	CP66	15724	4394	15749	4384	27
249	60126	83:28	59604	40	CP67	16072	4349	16082	4353	11
250	60538	83:48	60010	40	CP68	16481	4298	16481	4298	0
251	60830	84:08	60298	40	CP68	16770	4261	16766	4255	7
252	61128	84:28	60592	40	CP68	17066	4224	17058	4211	15
253	61128	84:48	60592	40	CP68	17066	4224	17058	4211	15
254	61372	85:08	60834	40	CP69	17308	4192	17340	4182	34
255	61576	85:08	61036	40	CP69	17510	4167	17541	4163	31
256	61630	85:48	61088	41	TA28	17559	4157	17556	4135	22
257	61718	86:08	61176	41	TA28	17545	4070	17542	4049	21
258	62004	86:28	61458	41	TA28	17500	3788	17497	3771	17
259	62298	86:48	61748	41	CP70	17453	3498	17461	3486	9
260	62536	87:08	61982	42	CP70	17430	3257	17433	3254	4
261	62538	87:28	61984	42	CP70	17431	3255	17433	3252	4
262	62562	87:48	62010	42	CP70	17428	3230	17429	3226	4
263	62882	88:08	62330	43	TA29	17702	3163	17696	3164	6
264	63290	88:28	62732	43	TA29	18108	3125	18096	3127	8
265	63558	88:48	63000	43	TA29	18375	3100	18363	3102	12
266	63910	89:08		43		18725	3067	18752	3064	27
267	64174	89:28	63612	44	TA30	18780	3299	18968	3325	29
268	64370	89:48	63806	44	TA30	18803	3494	18779	3519	35
269	64370	90:08	63806	44	TA30	18803	3494	18779	3519	35
270	64568	90:28	63996	44	CP72	18826	3690	18805	3715	33
271	64868	90:48	64296	44	CP72	18861	3988	18850	4012	26
272	65208	91:08	64634	44	CP72	18901	4326	18900	4346	20
273	65496	91:28	64926	45	TA31	18739	4457	18725	4455	14
274	65710	91:48	65138	45	TA31	18527	4482	18514	4474	15
275	65992	92:08	65420	45	CP73	18 6	4515	18226	4513	20
276	66310	92:28	65736	45	CP73	17931	4552	17913	4556	18
277	66704	92:48	66128	45	CP74	17539	4598	17555	4605	17
278	66962	93:08	66384	45	CP74	17283	4628	17307	4634	25
279	67020	93:28	66442	45	CP74	17225	4635	17243	4642	19
280	67052	93:48	66474	45	CP74	17194	4639	17212	4645	19
281	67318	94:08	66738	45	CP74	16929	4670	16949	4676	21
282	67624	94:28	67042	45	CP75	16625	4705	16623	4717	12
283	67716	94:48	67134	45	CP75	16534	4715	16532	4729	14
284	67938	95:08	67352	45	CP75	16313	4742	16316	4759	17
285	68054	95:28	67468	45	CP75	16198	4755	16201	4776	21

RUN # 34 SYSTEM LOCATION ERRORS (NO COMMUNICATION ERRORS)

PCP	ODOM	TIME	FIFTH	STSEG	SSG5	AVM X	AVM Y	REF X	REF Y	ERROR
286	68352	95:48	67764	46	CP75	15959	4786	15907	4816	60
287	68402	96:08	67814	46	CP75	15910	4793	15858	4823	57
288	68402	96:28	67814	46	CP75	15910	4793	15858	4823	60
289	68574	96:48	67984	46	CP75	15739	4817	15689	4847	58
290		97:08						15383	4869	
291										
292										

FIXED ROUTE AVM SYSTEM ERRORS, RUN 34

ERROR FREQUENCY DENSITY RUN 34

Error Interval	No. Samples	Percent of Samples
0- 10	19	6.59
10- 20	52	18.05
20- 30	52	18.05
30- 40	55	19.09
40- 50	27	9.37
50- 60	23	7.98
60- 70	17	5.90
70- 80	19	6.59
80- 90	13	4.51
90-100	4	1.38
110-120	1	.34
120-130	1	.34
140-150	1	.34
150-160	2	.69
190-200	2	.69
280-290	1	.34

Cumulative Errors Run 34

Error	Samples LT Error	Percent Samples LT Error
10	19	6.59
20	71	24.65
30	123	42.70
40	178	61.80
50	205	71.18
60	228	79.16
70	245	85.06
80	264	91.66
90	277	96.18
100	281	97.56
120	282	97.91
130	283	98.26
150	284	98.61
160	286	99.30
200	288	100.00
280-290	289	

FIXED ROUTE AVM SYSTEM RUN 35

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 35a

  ERROR       NO.      PERCENT OF
INTERVAL    SAMPLES     SAMPLES

   0-  10     35        13.73
  10-  20     41        16.08
  20-  30     35        13.73
  30-  40     30        11.76
  40-  50     44        17.25
  50-  60     14         5.49
  60-  70     16         6.27
  70-  80     22         8.63
  80-  90     10         3.92
  90- 100      2         0.78
 100- 110      1         0.39
 120- 130      4         1.57
 130- 140      1         0.39
```

```
CUMULATIVE ERRORS RUN 35a

ERROR # SAMPLES    PERCENT SAMPLES
         LT  ERROR         LT ERROR

   10       35            13.73
   20       76            29.80
   30      111            43.53
   40      141            55.29
   50      185            72.55
   60      199            78.04
   70      215            84.31
   80      237            92.94
   90      247            96.86
  100      249            97.65
  110      250            98.04
  120      250            98.04
  130      254            99.61
  140      255           100.00
AVERAGE ERROR        =   39.05
STANDARD DEVIATION =     26.94
```

FIXED ROUTE AVM SYSTEM RUN 35

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 35b

  ERROR       NO.      PERCENT OF
INTERVAL    SAMPLES      SAMPLES

   0-   10    35        13.73
  10-   20    44        17.25
  20-   30    37        14.51
  30-   40    30        11.76
  40-   50    39        15.29
  50-   60    14         5.49
  60-   70    16         6.27
  70-   80    21         8.24
  80-   90     9         3.53
  90-  100     4         1.57
 100-  110     1         0.39
 120-  130     4         1.57
 130-  140     1         0.39


CUMULATIVE ERRORS RUN 35b

ERROR # SAMPLES    PERCENT SAMPLES
        LT  ERROR          LT ERROR

   10        35             13.73
   20        79             30.98
   30       116             45.49
   40       146             57.25
   50       185             72.55
   60       199             78.04
   70       215             84.31
   80       236             92.55
   90       245             96.08
  100       249             97.65
  110       250             98.04
  120       250             98.04
  130       254             99.61
  140       255            100.00
AVERAGE ERROR        =    38.74
STANDARD DEVIATION =      27.27
```

FIXED ROUTE AVM SYSTEM RUN 36
LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 36a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	14	6.11
10- 20	40	17.47
20- 30	42	18.34
30- 40	16	6.99
40- 50	16	6.99
50- 60	20	8.73
60- 70	26	11.35
70- 80	23	10.04
80- 90	14	6.11
90- 100	4	1.75
100- 110	3	1.31
110- 120	2	0.87
130- 140	3	1.31
150- 160	5	2.18
200- 210	1	0.44

CUMULATIVE ERRORS RUN 36a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	14	6.11
20	54	23.58
30	96	41.92
40	112	48.91
50	128	55.90
60	148	64.63
70	174	75.98
80	197	86.03
90	211	92.14
100	215	93.89
110	218	95.20
120	220	96.07
130	220	96.07
140	223	97.38
150	223	97.38
160	228	99.56
210	229	100.00

AVERAGE ERROR = 47.85
STANDARD DEVIATION = 34.08

FIXED ROUTE AVM SYSTEM RUN 36
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 36b

  ERROR      NO.     PERCENT OF
 INTERVAL  SAMPLES    SAMPLES

   0-  10    14         6.11
  10-  20    40        17.47
  20-  30    43        18.78
  30-  40    16         6.99
  40-  50    16         6.99
  50-  60    19         8.30
  60-  70    26        11.35
  70-  80    21         9.17
  80-  90    13         5.68
  90- 100     5         2.18
 100- 110     3         1.31
 110- 120     3         1.31
 130- 140     4         1.75
 150- 160     5         2.18
 200- 210     1         0.44

CUMULATIVE ERRORS RUN 36b

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR       LT ERROR

   10        14            6.11
   20        54           23.58
   30        97           42.36
   40       113           49.34
   50       129           56.33
   60       148           64.63
   70       174           75.98
   80       195           85.15
   90       208           90.83
  100       213           93.01
  110       216           94.32
  120       219           95.63
  130       219           95.63
  140       223           97.38
  150       223           97.38
  160       228           99.56
  210       229          100.00
AVERAGE ERROR       =    48.20
STANDARD DEVIATION  =    34.90
```

FIXED ROUTE AVM SYSTEM RUN 37

LOCATION ERROR IN FEET

NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY      RUN 37a

 ERROR       NO.      PERCENT OF
INTERVAL   SAMPLES      SAMPLES

   0-   10   10          4.05
  10-   20   39         15.79
  20-   30   40         16.19
  30-   40   34         13.77
  40-   50   16          6.48
  50-   60   16          6.48
  60-   70   20          8.10
  70-   80   17          6.88
  80-   90   22          8.91
  90-  100    9          3.64
 100-  110    7          2.83
 110-  120    6          2.43
 120-  130    8          3.24
 150-  160    2          0.81
 210-  220    1          0.40
```

```
CUMULATIVE ERRORS  RUN 37a

ERROR # SAMPLES   PERCENT SAMPLES
          LT   ERROR        LT ERROR

   10       10             4.05
   20       49            19.84
   30       89            36.03
   40      123            49.80
   50      139            56.28
   60      155            62.75
   70      175            70.85
   80      192            77.73
   90      214            86.64
  100      223            90.28
  110      230            93.12
  120      236            95.55
  130      244            98.79
  160      246            99.60
  220      247           100.00
AVERAGE ERROR       =   50.84
STANDARD DEVIATION =   35.07
```

FIXED ROUTE AVM SYSTEM RUN 37

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 37b

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	10	4.05
10- 20	40	16.19
20- 30	40	16.19
30- 40	33	13.36
40- 50	15	6.07
50- 60	15	6.07
60- 70	19	7.69
70- 80	18	7.29
80- 90	22	8.91
90- 100	11	4.45
100- 110	7	2.83
110- 120	6	2.43
120- 130	8	3.24
150- 160	2	0.81
210- 220	1	0.40

CUMULATIVE ERRORS RUN 37b

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	10	4.05
20	50	20.24
30	90	36.44
40	123	49.80
50	138	55.87
60	153	61.94
70	172	69.64
80	190	76.92
90	212	85.83
100	223	90.28
110	230	93.12
120	236	95.55
130	244	98.79
160	246	99.60
170	246	99.60
180	246	99.60
190	246	99.60
200	246	99.60
210	246	99.60
220	247	100.00

AVERAGE ERROR = 51.07

STANDARD DEVIATION = 35.37

FIXED ROUTE AVM SYSTEM RUN 38
LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 38a

  ERROR       NO.     PERCENT OF
 INTERVAL   SAMPLES     SAMPLES

   0-   10    10         4.50
  10-   20    24        10.81
  20-   30    43        19.37
  30-   40    28        12.61
  40-   50    23        10.36
  50-   60    22         9.91
  60-   70    17         7.66
  70-   80    23        10.36
  80-   90    15         6.76
  90-  100    12         5.41
 100-  110     1         0.45
 110-  120     1         0.45
 190-  200     1         0.45
 860-  870     1         0.45
 870-  880     1         0.45
CUMULATIVE ERRORS  RUN 38a

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR        LT ERROR

   10        10            4.50
   20        34           15.32
   30        77           34.68
   40       105           47.30
   50       128           57.66
   60       150           67.57
   70       167           75.23
   80       190           85.59
   90       205           92.34
  100       217           97.75
  110       218           98.20
  120       219           98.65
  130       219           98.65
  870       221           99.55
  880       222          100.00
AVERAGE ERROR        =   54.62
STANDARD DEVIATION =     82.30
```

FIXED ROUTE AVM SYSTEM RUN 38

LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY  RUN 38b

  ERROR       NO.     PERCENT OF
INTERVAL    SAMPLES     SAMPLES

   0-   10      9        4.05
  10-   20     29       13.06
  20-   30     44       19.82
  30-   40     29       13.06
  40-   50     21        9.46
  50-   60     20        9.01
  60-   70     16        7.21
  70-   80     21        9.46
  80-   90     15        6.76
  90-  100     12        5.41
 100-  110      1        0.45
 110-  120      2        0.90
 190-  200      1        0.45
 860-  870      1        0.45
 870-  880      1        0.45
```

```
CUMULATIVE ERRORS   RUN 38b

ERROR # SAMPLES    PERCENT SAMPLES
         LT  ERROR         LT ERROR

   10        9             4.05
   20       38            17.12
   30       82            36.94
   40      111            50.00
   50      132            59.46
   60      152            68.47
   70      168            75.68
   80      189            85.14
   90      204            91.89
  100      216            97.30
  110      217            97.75
  120      219            98.65
  200      220            99.10
  870      221            99.55
  880      222           100.00
AVERAGE ERROR        =    53.75
STANDARD DEVIATION   =    82.57
```

FIXED ROUTE AVM SYSTEM RUN 39
LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY  RUN 39a

  ERROR       NO.     PERCENT OF
INTERVAL    SAMPLES    SAMPLES

   0-  10     12        4.27
  10-  20     19        6.76
  20-  30     34       12.10
  30-  40     37       13.17
  40-  50     33       11.74
  50-  60     50       17.79
  60-  70     47       16.73
  70-  80     17        6.05
  80-  90      6        2.14
  90- 100      5        1.78
 100- 110      9        3.20
 110- 120      3        1.07
 120- 130      1        0.36
 130- 140      6        2.14
 180- 190      1        0.36
 380- 390      1        0.36

CUMULATIVE ERRORS   RUN 39a

ERROR # SAMPLES    PERCENT SAMPLES
        LT   ERROR         LT ERROR

   10       12              4.27
   20       31             11.03
   30       65             23.13
   40      102             36.30
   50      135             48.04
   60      185             65.84
   70      232             82.56
   80      249             88.61
   90      255             90.75
  100      260             92.53
  110      269             95.73
  120      272             96.80
  130      273             97.15
  140      279             99.29
  150      279             99.29
  160      279             99.29
  170      279             99.29
  180      279             99.29
  190      280             99.64
  390      281            100.00
AVERAGE ERROR       =    52.67
STANDARD DEVIATION =    34.57
```

FIXED ROUTE AVM SYSTEM RUN 39
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY  RUN 39b

 ERROR        NO.      PERCENT OF
INTERVAL    SAMPLES     SAMPLES

   0-   10    12          4.27
  10-   20    19          6.76
  20-   30    34         12.10
  30-   40    39         13.88
  40-   50    33         11.74
  50-   60    48         17.08
  60-   70    45         16.01
  70-   80    17          6.05
  80-   90     7          2.49
  90-  100     6          2.14
 100-  110     9          3.20
 110-  120     3          1.07
 120-  130     1          0.36
 130-  140     6          2.14
 180-  190     1          0.36
 380-  390     1          0.36

CUMULATIVE ERRORS    RUN 39b

ERROR  # SAMPLES    PERCENT SAMPLES
         LT  ERROR         LT ERROR

   10        12              4.27
   20        31             11.03
   30        65             23.13
   40       104             37.01
   50       137             48.75
   60       185             65.84
   70       230             81.85
   80       247             87.90
   90       254             90.39
  100       260             92.53
  110       269             95.73
  120       272             96.80
  130       273             97.15
  140       279             99.29
  150       279             99.29
  160       279             99.29
  170       279             99.29
  180       279             99.29
  190       280             99.64
  390       281            100.00
AVERAGE ERROR        =    52.69
STANDARD DEVIATION =      34.75
```

FIXED ROUTE AVM SYSTEM RUN 40

LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 40a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	4	2.67
10- 20	14	9.33
20- 30	18	12.00
30- 40	33	22.00
40- 50	32	21.33
50- 60	25	16.67
60- 70	7	4.67
70- 80	13	8.67
80- 90	2	1.33
90- 100	2	1.33

CUMULATIVE ERRORS RUN 40a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	4	2.67
20	18	12.00
30	36	24.00
40	69	46.00
50	101	67.33
60	126	84.00
70	133	88.67
80	146	97.33
90	148	98.67
100	150	100.00

AVERAGE ERROR = 42.65
STANDARD DEVIATION = 19.07

FIXED ROUTE AVM SYSTEM RUN 40
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 40b

  ERROR       NO.      PERCENT OF
INTERVAL   SAMPLES      SAMPLES

   0-   10      4         2.67
  10-   20     13         8.67
  20-   30     20        13.33
  30-   40     34        22.67
  40-   50     34        22.67
  50-   60     24        16.00
  60-   70      5         3.33
  70-   80     12         8.00
  80-   90      1         0.67
  90-  100      3         2.00



 CUMULATIVE ERRORS RUN 40b

 ERROR # SAMPLES    PERCENT SAMPLES
         LT  ERROR       LT ERROR

    10        4              2.67
    20       17             11.33
    30       37             24.67
    40       71             47.33
    50      105             70.00
    60      129             86.00
    70      134             89.33
    80      146             97.33
    90      147             98.00
   100      150            100.00
 AVERAGE ERROR        =    42.03
 STANDARD DEVIATION =    18.77
```

RUN # 40 SYSTEM LOCATION ERRORS (NO COMMUNICATION ERRORS)

PCP	ODOM	TIME	FIFTH	STSEG	SSG5	AVM X	AVM Y	REF X	REF Y	ERROR
152	19276	53:17	19184	25	CP40	15289	6036	15315	6035	26
153	19405	53:37	19311	26	TA18	15265	6243	15256	6215	29
154	19443	53:57	19348	27	TA18	15270	6285	15266	6289	6
155	19541	54:17	19448	28	TA19	15376	6395	15113	6402	263
156	19695	54:37	19601	28	TA19	14872	6439	14809	6448	64
157	19829	54:57	19736	29	TA20	14672	6393	14671	6393	1
158	19880	55:17	19787	29	TA20	14658	6291	14659	6293	2
159	19951	55:37	19859	29	TA20	14641	6150	14641	6149	1
160	20131	55:57	20039	29	TA21	14596	5793	14537	5783	60
161	20280	56:17	20188	30	CP42	14886	5758	14603	5766	283
162	20280	56:37	20188	30	CP42	14886	5758	14603	5766	283
163	20374	56:57	20279	31	TA22	14867	5575	14870	5612	37
164	20520	57:17	20424	31	TA22	14830	5286	14830	5320	34
165	20524	57:37	20428	21	TA22	14829	5278	14828	5312	34
166	20659	57:57	20563	31	CP43	14795	5010	14796	5030	20
167	20676	58:17	20579	31	CP43	14791	4976	14792	4998	22
168	20855	58:37	20754	32	TA23	14417	5002	14496	4987	80
169	20910	58:57	20808	32	TA23	14308	5016	14388	4999	82
170	21038	59:17	20937	32	TA23	14054	5049	14132	5029	81
171	21104	59:37	21003	32	CP44	13923	5067	13928	5057	11
172	21113	59:57	21012	32	CP44	13906	5069	13911	5059	11
173	21117	60:17	21016	32	CP44	13898	5070	13903	5060	11
174	21213	60:37	21112	32	CP44	13707	5095	13713	5089	8
175	21402	60:57	21300	32	CP45	13332	5144	13342	5143	10
176	21591	61:17	21488	32	CP45	12958	5207	12970	5187	23
177	21591	61:37	21488	32	CP45	12958	5207	12970	5141	67
178	21650	61:57	21547	32	CP45	12841	5209	12852	5201	14
179	21884	62:17	21779	32	CP46	12377	5270	12424	5255	49
180	22063	62:37	21958	33	CP46	12052	5315	12068	5300	22
181	22075	62:57	21969	33	CP46	12028	5318	12047	5303	25
182	22224	63:17	22118	33	CP46	11733	5359	11751	5340	26
183	22271	63:37	22166	33	CP46	11640	5372	11656	5352	26
184	22339	63:57	22234	33	CP47	11505	5391	11492	5373	22
185	22359	64:17	22254	33	CP47	11466	5397	11453	5378	23
186	22496	64:37	22390	33	CP47	11194	5435	11183	5416	22
187	22539	64:57	22432	33	CP47	11109	5446	11100	5428	20
188	22681	65:17	22573	33	CP47	10828	5486	10821	5467	22
189	22893	65:37	22784	33	CP49	10408	5544	10399	5521	25
190	23205	65:57	23096	33	CP50	9790	5630	9586	5643	204
191	23380	66:17	23271	33	CP51	9443	5679	9504	5654	66

RUN # 40 SYSTEM LOCATION ERRORS (NO COMMUNICATION ERRORS)

PCP	ODOM	TIME	FIFTH	STSEG	SSG5	AVM X	AVM Y	REF X	REF Y	ERROR
192	23683	66:37	23574	33	CP51	8843	5763	8904	5735	67
193	23973	66:57	23863	33	CP52	8269	5843	8263	5824	20
194	24257	67:17	24146	34	TA24	7732	5909	7736	5891	18
195	24344	67:37	24233	34	TA24	7559	5919	7563	5912	8
196	24393	67:57	24280	35	CP53	7470	5932	7474	5968	36
197	24650	68:17	24536	35	CP54	7557	6439	7542	6504	67
198	24850	68:37	24736	35	CP54	7625	6833	7634	6894	62
199	24964	68:57	24847	36	CP55	7683	7032	7721	7027	38
200	25215	69:17	25099	36	CP55	8180	6966	8219	6961	39
201	25429	69:37	25312	36	CP56	8605	6910	8676	6905	1
202	25506	69:57	25388	36	CP56	8757	6890	8827	6887	70
203	25701	70:17	25583	36	CP56	9144	6839	9214	6841	70
204	25703	70:37	25585	36	CP55	9148	6838	9222	6840	74
205	25703	70:57	25685	36	CP56	9148	6838	9414	6813	267
206	26014	71:17	25895	36	CP56	9765	6757	9828	6742	84
207	26095	71:37	25977	36	CP57	9925	6736	9999	6718	76
208	26362	71:57	26243	36	CP57	10454	6666	10527	6650	74
209	26577	72:17	26457	36	CP57	10881	6609	10952	6596	72
210	26757	72:37	26637	37	CP57	11238	6562	11309	6550	72
211	26831	72:57	26710	37	CP57	11384	6543	11453	6531	70
212	26931	73:17	26809	37	CP57	11583	6517	11650	6506	68
213	26931	73:37	26809	37	CP57	11583	6517	11650	6506	68
214	27104	73:57	26981	37	CP57	11926	6472	12031	6457	106
215	27318	74:17	27194	37	CP58	12350	6416	12365	6423	17
216	27513	74:37	27388	37	CP59	12737	6365	12785	6374	49
217	27697	74:57	27571	37	CP60	13102	6317	13117	6328	19
218	27799	75:17	27673	37	CP60	13304	6290	13318	6294	15
219	27835	75:37	27710	37	CP60	13370	6281	13391	6281	21
220	27865	75:57	27740	37	CP61	13435	6272	13476	6268	41
221	28011	76:17	27882	38	TA26	13543	6095	13527	6063	36
222	28134	76:37	28005	38	TA26	13510	5852	13480	5822	42
223	28146	76:57	28017	38	TA26	13507	5828	13475	5798	44
224	28290	77:17	28161	38	CP62	13469	5542	13428	5467	85
225	28473	77:37	28342	38	CP63	13421	5180	13387	5110	78
226	28590	77:57	28458	38	CP63	13390	4948	13375	4878	72
227	28734	78:17	28603	39	TA27	13403	4701	13487	4693	84
228	28820	78:37	28689	39	TA27	13573	4677	13659	4679	86
229	28875	78:57	28744	39	TA27	13682	4662	13768	4670	86
230	29068	79:17	28934	39	CP65	14064	4609	14142	4610	78
231	29266	79:37	29131	40	CP66	14520	4547	14535	4553	16

RUN # 40 SYSTEM LOCATION ERRORS (NO COMMUNICATION ERRORS)

PCP	ODOM	TIME	FIFTH	STSEG	SSG5	AVM X	AVM Y	REF X	REF Y	ERROR
232	29338	79:57	29203	40	CP66	14663	4529	14678	4533	16
233	29575	80:17	29438	40	CP66	15133	4469	15143	4468	10
234	29832	80:37	29695	40	CP66	15643	4404	15652	4397	11
235	29878	80:57	29740	40	CP66	15734	4393	15741	4385	11
236	29879	81:17	29742	40	CP66	15736	4342	15745	4384	12
237	30080	81:37	29941	40	CP67	16135	4342	16150	4347	16
238	30269	81:57	30128	40	CP68	16510	4294	16514	4292	4
239	30335	82:17	30195	40	CP68	16641	4278	16646	4273	7
240	30549	82:37	30408	40	CP68	17066	4224	17068	4209	15
241	30549	82:57	30408	40	CP68	17066	4224	17068	4209	15
242	30627	83:17	30526	40	CP69	17221	4204	17331	4182	112
243	30775	83:37	30634	40	CP69	17514	4167	17546	4162	32
244	30845	83:57	30702	41	TA28	17545	4068	17543	4054	14
245	30974	84:17	30830	41	TA28	17504	3813	17502	3801	12
246	31081	84:37	30936	41	CP70	17470	3602	17474	3599	5
247	31216	84:57	31071	42	CP70	17439	3350	17442	3330	20
248	31349	85:17	31205	43	TA29	17529	3178	17566	3176	37
249	31595	85:37	31450	43	TA29	18018	3133	18055	3131	37
250	31815	85:57	31670	43	TA29	18456	3092	18493	3090	37
251	31847	86:17	31702	43	TA	18520	3085	18557	3084	37
252	31960	86:37	31817	43	TA30	18745	3065	18754	3104	40
253	32057	86:57	31913	43	TA30	18774	3250	18766	3296	47
254	32140	87:17	32000	44	TA30	18793	3414	18776	3469	58
255	32279	87:37	32131	44	CP72	18826	3690	18807	3729	43
256	32445	86:57	32297	44	CP72	18865	4018	18857	4057	40
257	32609	87:17	32459	44	CP72	18914	4435	18905	4376	60
258	32766	87:37	32618	45	TA31	18693	4463	18653	4461	40
259	32824	87:57	32676	45	TA31	18578	4476	18538	4472	43
260	32947	88:17	32798	45	CP73	18334	4505	18304	4502	30
261	33046	88:37	32897	45	CP73	18137	4528	18107	4529	30
262	33271	88:57	33122	45	CP73	17690	4580	17662	4591	30
263	33287	89:17	33137	45	CP73	17658	4584	17632	4595	28
264	33305	89:37	33155	45	CP74	17623	4588	17615	4598	13
265	33495	89:57	33345	45	CP74	17245	4633	17238	4642	11
266	33695	90:17	33544	45	CP74	16917	4679	16842	4689	14
267	33875	90:37	33723	45	CP75	16490	4721	16464	4739	32
268	33964	90:57	33812	45	CP75	16401	4742	16288	4763	115
269	33964	91:17	33812	45	CP75	16401	4742	16288	4763	115
270	34043	91:37	33891	45	CP75	16250	4760	16131	4785	112
271	34249	91:57	34095	46	CP75	15961	4786	15727	4842	241

AVM SYSTEM ERROR STATISTICS, RUN 40

ERROR FREQUENCY DENSITY RUN 40

Error Interval	No. Samples	Percent of Samples
0- 10	14	5.2
10- 20	37	13.75
20- 30	37	13.75
30- 40	48	17.84
40- 50	43	15.98
50- 60	26	9.66
60- 70	17	6.31
70- 80	24	8.92
80- 90	10	3.71
90-100	2	.74
100-110	1	.37
110-120	4	1.48
200-210	1	.37
240-250	1	.37
260-270	2	.74
280-290	2	.74

Cumulative Errors Run 40

Error	Samples LT Error	Percent Samples LT Error
10	14	5.2
20	51	18.95
30	88	32.7
40	136	50.5
50	179	66.54
60	205	76.2
70	222	82.5
80	246	91.44
90	256	95.16
100	258	95.91
110	259	96.28
120	263	97.76
210	264	98.14
250	265	98.51
270	267	99.25
290	269	100.00

FIXED ROUTE AVM SYSTEM RUN 41
LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY **RUN 41a**

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	46	13.98
10- 20	69	20.97
20- 30	24	7.29
30- 40	47	14.29
40- 50	51	15.50
50- 60	27	8.21
60- 70	38	11.55
70- 80	10	3.04
80- 90	8	2.43
100- 110	7	2.13
110- 120	1	0.30
190- 200	1	0.30

CUMULATIVE ERRORS **RUN 41a**

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	46	13.98
20	115	34.95
30	139	42.25
40	186	56.53
50	237	72.04
60	264	80.24
70	302	91.79
80	312	94.83
90	320	97.26
100	320	97.26
110	327	99.39
120	328	99.70
130	328	99.70
140	328	99.70
150	328	99.70
160	328	99.70
170	328	99.70
180	328	99.70
190	328	99.70
200	329	100.00

AVERAGE ERROR = 37.26
STANDARD DEVIATION = 25.74

FIXED ROUTE AVM SYSTEM RUN 41

LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 41b

  ERROR      NO.     PERCENT OF
INTERVAL   SAMPLES     SAMPLES

   0-  10    47        14.29
  10-  20    68        20.67
  20-  30    25         7.60
  30-  40    46        13.98
  40-  50    49        14.89
  50-  60    27         8.21
  60-  70    38        11.55
  70-  80     9         2.74
  80-  90     8         2.43
  90- 100     1         0.30
 100- 110     8         2.43
 110- 120     1         0.30
 190- 200     1         0.30
****-****     1         0.30
```

```
CUMULATIVE ERRORS  RUN 41b

ERROR # SAMPLES   PERCENT SAMPLES
        LT  ERROR        LT ERROR

   10       47            14.29
   20      115            34.95
   30      140            42.55
   40      186            56.53
   50      235            71.43
   60      262            79.64
   70      300            91.19
   80      309            93.92
   90      317            96.35
  100      318            96.66
  110      326            99.09
  120      327            99.39
  130      327            99.39
  140      327            99.39
  150      327            99.39
  160      327            99.39
  170      327            99.39
  180      327            99.39
  190      327            99.39
  200      328            99.70
```

FIXED ROUTE AVM SYSTEM RUN 42
LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 42a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	18	7.79
10- 20	26	11.26
20- 30	38	16.45
30- 40	26	11.26
40- 50	38	16.45
50- 60	20	8.66
60- 70	24	10.39
70- 80	17	7.36
80- 90	10	4.33
90- 100	7	3.03
100- 110	3	1.30
110- 120	1	0.43
140- 150	1	0.43
150- 160	1	0.43
370- 380	1	0.43

CUMULATIVE ERRORS RUN 42a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	18	7.79
20	44	19.05
30	82	35.50
40	108	46.75
50	146	63.20
60	166	71.86
70	190	82.25
80	207	89.61
90	217	93.94
100	224	96.97
110	227	98.27
120	228	98.70
130	228	98.70
140	228	98.70
150	229	99.13
370	230	99.57
380	231	100.00

AVERAGE ERROR = 45.44
STANDARD DEVIATION = 34.42

FIXED ROUTE AVM SYSTEM RUN 42

LOCATION ERROR IN FEET

5% COMMUNICATION ERRORS

```
ERROR FREQUENCY DENSITY RUN 42b

  ERROR       NO.     PERCENT OF
INTERVAL    SAMPLES    SAMPLES

   0-   10    19         8.23
  10-   20    27        11.69
  20-   30    39        16.88
  30-   40    27        11.69
  40-   50    36        15.58
  50-   60    21         9.09
  60-   70    20         8.66
  70-   80    16         6.93
  80-   90    12         5.19
  90-  100     7         3.03
 100-  110     4         1.73
 140-  150     1         0.43
 150-  160     1         0.43
 370-  380     1         0.43
```

```
CUMULATIVE ERRORS RUN 42b

ERROR # SAMPLES    PERCENT SAMPLES
        LT  ERROR        LT ERROR

   10        19             8.23
   20        46            19.91
   30        85            36.80
   40       112            48.48
   50       148            64.07
   60       169            73.16
   70       189            81.82
   80       205            88.74
   90       217            93.94
  100       224            96.97
  110       228            98.70
  120       228            98.70
  130       228            98.70
  140       228            98.70
  150       229            99.13
  370       230            99.57
  380       231           100.00
AVERAGE ERROR         =   44.80
STANDARD DEVIATION    =   34.56
```

FIXED ROUTE AVM SYSTEM RUN 43
LOCATION ERROR IN FEET
NO COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 43a

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	10	5.38
10- 20	15	8.06
20- 30	16	8.60
30- 40	20	10.75
40- 50	31	16.67
50- 60	27	14.52
60- 70	6	3.23
70- 80	30	16.13
80- 90	10	5.38
90- 100	6	3.23
100- 110	5	2.69
110- 120	2	1.08
120- 130	2	1.08
130- 140	2	1.08
140- 150	3	1.61
220- 230	1	0.54

CUMULATIVE ERRORS RUN 43a

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	10	5.38
20	25	13.44
30	41	22.04
40	61	32.80
50	92	49.46
60	119	63.98
70	125	67.20
80	155	83.33
90	165	88.71
100	171	91.94
110	176	94.62
120	178	95.70
130	180	96.77
140	182	97.85
150	185	99.46
220	185	99.46
230	186	100.00

AVERAGE ERROR = 54.89
STANDARD DEVIATION = 32.86

FIXED ROUTE AVM SYSTEM RUN 43
LOCATION ERROR IN FEET
5% COMMUNICATION ERRORS

ERROR FREQUENCY DENSITY RUN 43b

ERROR INTERVAL	NO. SAMPLES	PERCENT OF SAMPLES
0- 10	10	5.38
10- 20	16	8.60
20- 30	16	8.60
30- 40	19	10.22
40- 50	30	16.13
50- 60	27	14.52
60- 70	6	3.23
70- 80	30	16.13
80- 90	10	5.38
90- 100	6	3.23
100- 110	5	2.69
110- 120	3	1.61
120- 130	2	1.08
130- 140	2	1.08
140- 150	2	1.08
170- 180	1	0.54
220- 230	1	0.54

CUMULATIVE ERRORS RUN 43b

ERROR	# SAMPLES LT ERROR	PERCENT SAMPLES LT ERROR
10	10	5.38
20	26	13.98
30	42	22.58
40	61	32.80
50	91	48.92
60	118	63.44
70	124	66.67
80	154	82.80
90	164	88.17
100	170	91.40
110	175	94.09
120	178	95.70
130	180	96.77
140	182	97.85
150	184	98.92
160	184	98.92
170	184	98.92
180	185	99.46
230	186	100.00

AVERAGE ERROR = 55.22
STANDARD DEVIATION = 33.71

MANUALLY PROCESSED FIXED ROUTE

RUN # 43   SYSTEM LOCATION ERRORS   (NO COMMUNICATION ERRORS)

PCP	ODOM	TIME	FIFTH	STSEG	SSG5	AVM X	AVM Y	REF X	REF Y	ERROR
186	56382	62:10	56154	38	CP62	13490	5697	13447	5617	91
187	56706	62:41	56480	38	CP62	13447	5376	13417	5293	88
188	57232	63:07	57002	38	CP64	13378	4855	13354	4673	184
189	57380	63:27	57156	38	TA27	13358	4707	13454	4696	97
190	57670	63:47	57444	39	TA27	13644	4667	13740	4672	96
191	57680	64:07	57456	39	TA27	13654	4666	13752	4671	108
192	58042	64:27	57816	39	CP65	14013	4615	14111	4615	98
193	58366	64:47	58136	40	CP66	14417	4560	14436	4567	20
194	58784	65:07	58556	40	CP66	14831	4507	14852	4509	21
195	59280	65:27	59048	40	CP66	15324	4445	15339	4441	16
196	59682	65:47	59450	40	CP66	15722	4394	15737	4386	17
197	60094	66:07	59860	40	CP67	16131	4342	16138	4348	9
198	60580	66:27	60342	40	CP68	16613	4281	16607	4279	6
199	61116	66:47	60878	40	CP69	17145	4214	17171	4197	31
200	61540	67:07	61296	41	TA28	17559	4155	17558	4147	8
201	61686	67:27	61622	41	TA28	17507	3831	17506	3826	5
202	62144	67:47	61894	41	CP70	17463	3559	17470	3561	7
203	62440	68:07	62190	42	CP70	17436	3452	17434	3267	185
204	62750	68:27	62506	43	TA29	17604	3172	17674	3166	70
205	63184	68:47	62938	43	TA29	18036	3131	18104	3126	68
206	63482	69:07	63232	43	TA29	18333	3103	18397	3099	64
207	63736	69:27	63488	43	TA29	18586	3080	18652	3076	66
208	63932	69:46	63684	44	TA30	18755	3093	18746	3168	76
209	64268	70:06	64018	44	TA30	18795	3426	18726	3501	102
210	64594	70:26	64342	44	CP72	18833	3750	18847	3996	246
211	64976	70:46	64720	44	CP72	18878	4129	18904	4370	242
212	65168	71:06	64912	44	CP72	18900	4319	18933	4560	243
213	65240	71:26	64986	44	TA31	18909	4391	18898	4438	48
214	65596	71:46	65344	45	TA31	18606	4473	18542	4472	64
215	65608	72:06	65356	45	TA31	18594	4474	18530	4473	64
216	65904	72:26	65560	45	CP73	18300	4509	18260	4508	40
217	66272	72:46	66016	45	CP73	17935	4552	17897	4559	39
218	66752	73:06	66496	45	CP74	17458	4608	17418	4621	42
219	67058	73:26	66800	45	CP74	17154	4643	17369	4627	216
220	67416	73:46	67156	45	CP74	16798	4685	16763	4698	37
221	67416	74:06	67156	45	CP74	16798	4685	16763	4698	37
222	67590	74:26	67330	45	CP75	16625	4705	16597	4720	32
223	68052	74:46	67790	45	CP75	16166	4759	16141	4784	35
224	68524	75:06	68260	46	CP75	15706	4822	15676	4849	40

ERROR FREQUENCY DENSITY RUN 43

Error Interval	No. Samples	Percent of Samples
0- 10	15	6.66
10- 20	18	8.0
20- 30	17	7.5
30- 40	28	12.44
40- 50	33	14.66
50- 60	27	12.0
60- 70	11	4.8
70- 80	32	14.22
80- 90	11	4.88
90-100	10	4.44
100-110	7	3.11
110-120	2	.88
120-130	2	.88
130-140	2	.88
140-150	3	1.33
180-190	2	.88
220-230	1	.44
210-220	1	.44
240-250	3	1.33

Cumulative Errors Run 43

Error	Samples LT Error	Percent Samples LT Error
10	15	6.66
20	33	14.66
30	50	22.22
40	78	34.66
50	111	49.33
60	138	61.33
70	149	66.22
80	181	80.44
90	192	85.33
100	202	89.77
110	209	92.88
120	211	93.77
130	213	94.66
140	215	95.55
150	218	96.88
190	220	97.77
220	221	98.22
230	222	98.66
250	225	100.00

RESULTS OF IMPOSING 5 PERCENT COMMUNICATION ERROR RATE ON MANUALLY COMPUTED DATA FROM RUNS 24, 34, 40, AND 43

Run No.	PCP * Number	Error with No Communication Errors	Error with 5% Communication Errors
24	233	8	7
34	171	34	34
34	192	11	40
34	233	152	4
34	261	4	4
34	288	60	60
40	171	11	34
40	192	67	68
40	233	10	12
40	261	30	29
43	192	98	86

* The PCP number on which communication errors were simulated were those determined by the use of the Random Number Table in FRSYS.

4.2.3 Fixed Route One-Tenth Mile Averages

Output data from the FRTEN program are presented herein for each Fixed Route data run. Each entry corresponds to the average error for all samples taken over 528 foot segments of the run. The format is as follows:

```
Segment        Segment ----------------- Segment

   1              2                        10

Segment        Segment ------------------ Segment

   11             12                        20

   .

   .

   .
```

On Run 14, Segments 74, 75, and 76 produced average errors of 743, >999, and 752 feet. As explained fully in Section 8 of Volume I, analysis of the individual records in these segments indicate no single error of that magnitude. As was observed and verified in one or two other instances, it is assumed that these errors resulted from a tape read error. Note that the errors associated with these same three street segments on the other runs do not approach these values. For example, the maximum average value computed for the other 28 runs over any of these three street segments was 73 feet.

On Run 31, Segments 10 and 11 have errors of 390 and 329 feet respectively. These errors occurred in the region in which 5th wheel errors were observed and noted on the log sheet.

```
RUN 11   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  65   55   46   37   22   20   32   54   69   57
  79   86   82   71   79   59    8   15   76  100
  72   58   26   24   60   30   15   47   50   46
  39   37   40   46   27   12   25   41   80   47
  46   38  116   32   26   45   48   60   88   72
  73   50   40   39   30   26   14   14   20   15
* 18   43   51   61   57   32   29   26   14    8
 CT1:RUN011.001

  11   10   69   46   49   10   12    6   66   82
  81   20   17   26   26   24   23   40   31   27
  31   32   49   57   73   74   63   79   79   72
  71   34   64   28   51   86   96  107  110   58
  57   53   39   44   71   54    6    8   22  140
  34   28   29   29   13   20   37   55
.
```

```
RUN 12   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  42   35   27   25   25   25   30   61   62   60
  94   98   89   83   86   41   17   43   93  105
  82   71   28   53   46   26   14   74   74   55
  26   23   21   19   29   15   23   58   96   51
  50   53  109   95   84   29   40   61   82   69
  69   34   45   56   49   37   21   23   21   11
* 24   66   54   62   53   23   22   25   22   10
 CT1:RUN012.001

  11    4   53   38   13   33   15   23   52   63
  47   22   22   25  113   27   30   38   22   26
  29   34   53   69   75   76   81   98   96   88
  88   51   65   51   71  102  121  115   88   62
  64   57   53   60   76   60   31   42   49   65
  57   59   64   61   50   56   75   61
.
```

```
RUN 13   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   28    25    18    16    14    13     4    34    25    31
   59    61    60    43    44    19     2    36    65    87
   76    57    23    39    60    30    17    47    49    49
   45    45    42    26    14    20    17    39   105    85
   80    73   115   142   155    31    34    49    71    52
   40    50    58    54    34    29    13    24    19    10
 * 23    52    55    36    16    36    71    19    27    38
  CT1:RUN013.001
   39    57    52   130    78   124   116   132    53    43
   72    35    17    27    38    33    34    44    29    34
   32    43    68    80    82    83    75    94    93    68
   67    34    45    27    44    87    87    89    50    19
   17    19    15    21    41    22    20    36    38    47
   46    44    49    48    29    37    53    41
```

```
RUN 14   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   22    10    14    19    24    23    10    41    42    26
   61    75    67    40    32    25     6    10    81   104
   80    66    39    36    74    33    20    23    25    23
   15    14    14    16    23     9    37    78    96    66
   62    55   127    48    21    39    41    48    81    68
   58    53    53    45    16    16    14    12    21    15
    6    40    82   743   ***   752    98    44    61    65
   57    53    37    37    29    43    32    37    36    36
   28    15    17    30    36    32    31    34    30    25
   19    55    75
```

```
RUN 15   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  31    29    20    14     8     6    12    56    14    42
  60    61    48    48    43    28    16    45    98   112
  87    67    47    82    48    19    15    22    20    18
  15    14    12    17    13    12    55   108    71    69
  63   104    96    87    65    40    49    75    79    67
  74    31    57    37    35    13    19    29    14     8
  26    62    38    32    17    38    32    16    38    33
  30    45    49   127    83   125   101   110    50    55
  72    13    22    32    39    31    38    36    23    56
* 19    25    40    45    46    44    47    53    57    58
 CT1:RUN015.001

  39    36    27    32    61    85    90    91    24    20
  21    26    26    39    43    14    34    35    39    44
  33    46    45    33    21    38    61
.
```

```
RUN 16   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  40    28    24    21    17    16    39    73    51    54
  80    86    76    66    59    53    25    39    96   114
  81    73    45    63    69    29    16    35    35    32
  26    26    25    22    10     8    11    25   114    81
  78    74   140    39    35    29    34    51    69    54
  36    38    49    50    40    27    15    24    23    17
  27    56    55    47    35    10    16    18    16    14
  13    12    54    31    70    16    26    20    98    84
  59    22    21    36    47    41    32    21    27    31
  45    47    55    66    65    67    72    84    77    53
* 53    20    37     9    35    60    58    56    42    30
 CT1:RUN016.001

  30    23    16    27    48    31    23    34    40    48
  42    45    50    44    17    30    50    50
.
```

```
RUN 17   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


 105    98    93    86    82    43    41    80    50    61
  89    91    78    78    76    32    29    57    97   113
  87    63    43    83    40    25    37    45    43    34
  29    27    27    14    33    28    77    73    46    45
  38    67    77    15    19    41    42    74    70    62
  58    35    49    47    45    23    28    31    17    21
  42    73    49    33    16    15    13    10    29    24
* 26    37    46     6    47     9     8    42    92    91
 CT1:RUN017.001

  46    13    20    25    27    19    38    35    30    32
  25    40    60    61    63    65    66    73    62    54
  40    50    28    38    57   101    92    96    10     8
  12    10     5    32    27    14     4     2    25    33
  19    27    20    14     9    27    54
```

```
RUN 18   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  57    58    59    52    42    41     5    27    42    29
  51    59    60    52    47    37    16    34   106   111
  98    71    45    63    87    28    18    54    54    47
  33    31    28    30    14    11    27    42    85    72
  66    57    93    51    41    20    25    39    54    37
  48    45    54    49    32    28    16    32    25    15
* 21    49    51    38    20    44    88    45    53    59
 CT1:RUN018.001

  56    61    39   256    55   105   106   142    38    46
  63    23    19    27    30    31    34    47    35    32
  27    33    53    69    68    70    64    71    72    65
  65    55    55    30    44    92   104   104    95    31
  30    29    18    23    42    24    15    19    19    36
  33    24    24    24    18    10    29    57
```

```
RUN 20   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  19    6   20   26   33   35   28   53   57   52
  73   86   84   70   73   48    7   15   62   83
  45   34   13   12   38   30   19   54   65   71
* 53   61   61   54   28    8   30   48  116   83
 CT1:RUN020.001

  83   66  111   64   61   20   24   23   37    9
   7   79   96   64   50   46   36   47   42   36
  48   73   93   46   25   51   66   61   53   16
  12   30  103  154   83  127  131  146   75   70
49152.0 49152.0      0.0      0.0      0.0      0.0    20      0
?ERR 12 FLOATING ZERO DIVIDE
IN   ROUTINE ".MAIN."  LINE 148
```

```
RUN 21   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  29   16   14   17   24   30   11   21   41   69
  29   30   23   17   11    5   10   17   76   87
  62   39    7   18   49   27   22   65   81   75
  54   68   69   60   21   11   14   78   85   91
  94   90  109  155  126   21   17   35   31   15
  32   89  109   31   36   22   26   40   30   30
  39   82   71   58   42   29   37   29   32   28
* 28   70   66  123   89  126  109  117   61   63
 CT1:RUN021.001

  77   21   28   32   24   31   66   61   32   56
  25   16   22   23   15   15   23   24   25   28
  20   24   22    8   35   53   39   30   17   12
   9    9   16   22    2    6    9    2   22   27
   7    8   14   18   25   15   57
```

```
RUN 22   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   49    33    21    13    10    12     6    13    13    14
   41    39    26    18    19     9     7    30    52    71
   38    16    19    34    39    40    47    65    89    73
   76    91    84    53    16    21    23   116   112   120
   85   149    65    45    22    25    23    44    18    22
   63    72    89    66    66    46    60    53    46    72
   92    96    75    43    21    32    27    17    13    25
   71    74   101    69   135   127   138    63    73    83
*  29    23    22    24    20    42    68    20    58    37

 CT1:RUN022.001

   31    40    40    24    29    44    45    34    25    20
   19    24    20    37    35    29    36    30    21    10
    9    22    25    12    28    20    30    23    34    33
   39    31    49    63    49    48
.
```

```
RUN 23   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   15     4    18    22    17    22     6    30    13    13
   23    32    21    14     9     9    22    25    41    53
   34    20    43    42    43    58    55    71    97    89
   85   103    90    56    14    22    14   107   104   107
  100   152    64    43    38    24    17    47    25    13
   45    69    71    49    54    36    48    55    54    70
   88    84    56    23    29    67    15    30    29    21
*  11    95   106   120   144   150   169   108    96   127
 CT1:RUN023.001

   64    28    20    22    21    32    75    37    53    46
   28    39    52    53    39    37    43    39    32    26
   15    18    22    33    40    47    40    17     7     7
   10    31    37    17    44    31    47    26    33    42
   39    38    52    72    57    56
.
```

```
RUN 24   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  25   55   32   16   15   20   30   55   48   51
  64   62   52   41   44   23   12   24   53   67
  40   23   24   34   30   31   34   72  100   89
  76   97   87   54    4   19   55   75  102  105
 102  136  124   57   49   28   13   35   21    8
  35   71   99   57   66   33   49   60   40   57
  77  109   98   63   64   32   31   23   16   22
  32   94   90  136  122  156  158  129  100  115
* 93   15   23   21   25   30   61   54   49   42
 CT1:RUN024.001

  25   37   46   50   43   47   49   43   31   27
  16   20   19   18
*
```

```
RUN 25   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  34   13   13   12    8    4    9   37   27   24
  50   53   42   28   25   16    6   21   61   83
  53   40    7   26   42   39   43   77  102   97
  84  100   83   68    5   16    8   74   98   96
  90  123
*
 CT1:RUN025.001
?ILL CMD?

*
```

```
RUN 26   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  16    3   18   27   34   34    7   30   39   14
  32   40   38   24   29    9    5    4   61   77
  60   42   12   10   45   30   16   52   70   78
  51   66   68   64   27   16   12   20  101   91
  87   71  150   80   31   22   26   30   49   34
  19   89   95   64   34   26    9   28   31   25
 156   62   75   54   41   23   39   14   16   17
  16   12   19   20   22   36   25   38   39   38
* 23   14   21   26   25   23   25   49   30   24
 CT1:RUN026.001
  23   27   38   48   51   50   41   57   57   56
  56   21   28   11   31   57   61   58   52   27
  25   22   24   33   35   14   14   25   26   30
  26   16   19   20   10   11   20   58
.
```

```
RUN 27   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  46   34   17   12    9   12   40   60   59   68
  88   87   78   74   66   30    9   26   67   78
  50   28    6   31   36   23   34   64   78   71
  64   71   66   34    7   16   22   84   70   70
  60  105   98   37   33   31   30   57   67   49
  41   41   69   50   50   30   32   39   29   36
  51   86   75   29   21   38   38   12   29   14
  15   51   34  105   62  113   95   90   34   33
* 64   14   22   61   71   21   34   41   27   40
 CT1:RUN027.001
  16   24   42   53   58   48   43   45   42   39
  11   20   16   10   36   57   58   67   35   29
  30   19   13   41    8   37   27   27   24   33
  22   17   16   21   42   18   53
.
```

```
RUN 28   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   23    8   13   15   17   16    8   28   50   38
   63   67   67   67   46   33   20   57   90  102
   76   58   35   46   64   29   16   56   67   62
   40   43   42   47   12   13   22   42   85   59
   57   57  135   21   21   24   31   50   63   45
   35   56   75   55   52   34   25   45   37   36
   50   71   63   66   57   23   31   30   24   12
 * 15    7   33   16   44   13    8   14   67   65
  CT1:RUN028.001

   44   13   19   22   37   22   34   44   36   33
   21   28   56   71   73   73   69   68   68   67
   62   33   45   30   52   77   88   84   24   11
   12    7    2   16   25   21   31   29   19   25
   34   20   14   19   42   25   27   62
 .
```

```
RUN 29   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   38   23   12   11    9   15   11   41   10   14
   41   42   36   34   26   22   22   46   91   97
   70   49   20   51   44   28   39   67   79   73
   65   68   62   43   17   20   18   70   57   54
   50   81  159   58   49   23   15   17   32   35
   41   43   65   24   26   17   20   31   27   28
   36   71   55   52   29   27   32   24    8   11
   13   19   59   11   50   23    8   28   55   59
 * 34   13   20   22   27   19   43   51   38   47
  CT1:RUN029.001

   31   22   34   40   41   37   27   26   31   50
   35   43   49   34   55   85   97   98   15    5
    8   13    7   20   33   10   41   46   56   66
   59   54   61   50   31   47   63
 .
```

```
RUN 30    FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   24     8    13    14    20    17    25    43    50    36
   49    71    62    47    41    31    11    18    79   104
   70    51    20    20    59    31    23    67    77    83
   60    68    69    76    33     8    28    48    72    67
   65    59   120    20    21    32    34    45    68    51
   39    48    60    75    68    64    48    56    53    51
   52    79    97    71    48    20    16    10    10     9
 * 15    17    68    21    29    47    21    25    42    40
  CT1:RUN030.001

   33    13    20    23    24    23    28    52    28    31
   38    28    43    50    57    62    65    70    70    49
   50    19    41    10    28    59    63    61    59    35
   37    25    21    28    40    24     9    17    18    33
   37    36    42    43    16    20    41    43
.
```

```
RUN 31    FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   48    47    45    40    99   312   159    43    61   390
  329    89    89    70    69    61    29    17    49   103
  105    73    49    27    60    37    17    28    46    55
   45    37    40    46    18     6    15     1    86    81
   79    73   107   126    26    25    32    29    56    63
   39    21    40    66    44    43    22    24    38    25
   23    33    77    68    37    12    54    54    27    43
   29    35   113    34   118    71   126   102   113    47
 * 46    76    13    21    33    39    32    32    32    27


CT1:RUN031.001

   34    28    36    45    49    49    55    57    51    54
   55    43    32    26    24    58    76    83    78    51
   30    32    18    16    38    27    13     2     2    17
   30    15    21    25    22     9    20    36
.
```

```
RUN 34   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  88    74    64    61    58    52    30    62    40    45
  71    73    70    57    71    51    25    33    70    94
  67    49    10    23    50    27    16    45    54    57
  45    54    55    52    24    11     7    17   159    77
  71    55   146    61    56    21    15    22    34    16
  25    86    97    36    32    16    21    24    26    24
  39    74    77    58    47    22    33
.
```

```
RUN 35   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  55    38    27    19    13     7     8    26    22    12
  43    45    36    28    26    10     5    14    49    76
  51    23     7    21    44    37    36    68    80    80
  63    73    78    67    19    11    12    15    76    86
  84    77   140    31    33    22    22    37    54    42
  33   127   128    51    45    39    19    25    32    30
  35    72    70    68    63    24    20    37    34    29
* 39    43    66    16    41    16    10    22    62    58
 CT1:RUN035.001

  38    13    19    27    28    26    34    55    21    38
  38    26    21    34    45    44    43    50    50    68
  63    30    43    23    39    68    76    67    32    22
  20     8     4    16    10     6     9     5     7    22
  12     6     6    10    25    19    29
.
```

```
RUN 36   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   57    34    26    17     8     6     2    34    13     7
   24    23    16    14    12    10     8    30    82    92
   63    45    12    40    38    24    31    54    61    62
   61    68    69    42    17    14    20    51    75    74
   71    98    92    38    37    24    19    44    43    22
   37    59    79    38    40    30    33    46    61    55
   51    98    88    40    22    43    43    12    23    14
   17    85    99   132    93   152   128   139    78    70
  104    24    23    20    24    18    42    48    21    43
*  25    42    53    62    65    67    69    69    70    69

 CT1:RUN036.001

   56    40    36    29    52    82    86    85    22    15
   14     9     5    19    19    33    65    68    28    33
   31    25    22    32    45    39    48
.
```

```
RUN 37   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   64    45    23    18    15    13    12    49    22    20
   26    39    29    16    15     4    21    24    88   105
   78    72    30    29    59    30    27    58    71    72
   55    66    75    70    27    10    30    53    96    82
   80    64   115    58    51    22    21    32    43    26
   18    80    94    49    41    56   108    31    38    39
   52    84    77    43    12    51    56    23    33    31
   27    73    36   133    71   119   103   121    59    59
*  80    18    19    22    26    20    35    52    20    38
 CT1:RUN037.001

   25    45    60    66    62    65    66    61    66    79
   71    53    47    36    60    81    92    79    38    24
   22    12     3    20    14     6    12    12    21    37
   20    15    15    14    21    17    28
.
```

```
RUN 38   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   48    45    29    18    11     7    39    56    67    49
   79    82    75    52    56    40    26    33    90   108
   69    51     8    24    50    28    27    59    67    66
   57    66    72    60    37    27    38    50    61    53
   54    53    95    34    35    26    26    41    49    29
   24    67    87    35    29    24    17    28    19    15
   36    73    74    42    14    57    63    23    40    34
   31    24    91    45    62    19    42    32    96    88
   64    58    63    79    88    80    49    29    96    37
*  21    52    65    72    70    70    77    82    80    78
  CT1:RUN038.001

   68    42    49    24    48    74    79    79    34    25
   21    14     5    32    17     5    20    18    19    31
   17    15    13    14    18    16    36
 .
```

```
RUN 39   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  106    97    88    77    63    54    34    46    55    46
   68    69    62    56    61    18     4    12    67    79
   53    30     4    16    38    28    23    56    61    65
   65    67    70    71    41    31    57    70    55    57
   54    36   126    52    44    69   213    25    37    22
    6    76    97    55    47    44    36    55    47    47
   53    81    87    58    47    16    31    25    17    15
*  16    25    28   108    67   126   116   114    58    59
  CT1:RUN039.001

   97    36    25    21    23    20    31    56    20    36
   28    29    49    61    65    58    49    47    45    42
   38    61    33    10    34    66    66    61    55    47
   45    45    38    42    50    31    30    22    38    65
   55    55    56    52    34    43    51    39
 .
```

```
RUN 40   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  68   60   50   42   32   29   28   69   41   48
  73   72   67   48   49   22   12   25   69   82
  66   39   12   25   36   26   22   53   54   49
  42   45   42   27   54   33   46   52   51   45
  44   46  109   13   21   37   37   55   65   48
  34   53   76   40   37   26   21   35   30   30
  44   80   83   55   39   16   31   23   16   17
  23

.
 CT1:RUN040.001
?ILL CMD?


.
```

```
RUN 41   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


  44   16   14   12    7   10    7   22   11   13
  19   35   32   17    7    2    1   32   78   82
  58   46    6   13   31   28   22   49   52   49
  40   42   44   41   16   11   17   51   96   60
  61   62  105   96   92   26   27   42   62   47
  48   48   53   73   71   71   65   69   65   62
* 62   84   90   55   25   25   45   10   11   12

 CT1:RUN041.001

  14   11   48   35   32   45   30   38   38   38
  14   10   16   31   31   35   33   42   44   39
  47   25   32   43   48   45   38   40   40   38
  37   13   14    7   23   55   65   62   58   25
  21   19   13   24   50   26   13    4    3   15
  18    5    7    6   29   30   20   67
.
```

```
RUN 42   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   75    64    41    37    34    32    39    55    57    61
   84    83    77    66    59    34     8    25    79    92
   66    45    14    34    42    23    26    48    49    48
   39    41    46    30    17    15    30    52    85    69
   65    53   122    43    41    21    15    31    40    17
    9    73    95    58    55    47    23    37    42    43
   56    84    88    50    16    69    76    34    55    46
   36    29    66    13    34    21    16    31    42    44
   24    13    20    26    26    19    36    62    20    32
 * 23    57    63    71    74    75    71    64    63    61
  CT1:RUN042.001

   36    29    34    29
 .
```

```
RUN 43   FIXED ROUTE
AVERAGE ERROR IN FEET OVER ONE-TENTH MILE SEGMENTS


   62    44    34    29    21    23    33    77    68    57
   78    76    67    58    46    16     3    27    79    79
   52    33    14    42    36    22    30    53    54    48
   40    42    42    14    26    17    41    72    80    79
   72    93   112    25    28    32    28    55    60    37
   35    55    82    56    57    40    40    49    43    44
   53    89    80    50    34    33    36    14    12     8
   10    32    46   121    79   137   125   128    59    59
   91    76    80    90    90    81    54    39    79    37
 * 22    64    63    70    74    71    72    76    75    73
  CT1:RUN043.001

   61    37    41    43    63
 .
```

4.2.4 Off Route Declaration

During Fixed Route Runs 38-43, a pair of signposts were installed along the fixed route between CP 36 and CP 37. When the AVM system records a code from either of these signposts, it was programmed to declare that the bus was off route. These results are shown in this section and are the output listings of the FRLS program. The values of the location errors incurred while the off route condition was being simulated are computed and presented in Section 8 of Volume I.

```
FIXED ROUTE RUN # 39 CHECKPOINT ERRORS   OFF ROUTE DECLARATION

CP#   X(CP)   Y(CP)   SF#   SEG.   INCREM   COMP X    COMP Y    ERROR

  1   12431    4529   16      3       72.   12410.    4548.       29.
  2   12895    3792    1      4      483.   12811.    3817.       88.
  3   13632    3698    1      4     1245.   13567.    3718.       68.
  4   14904    3541    2      5       24.   14869.    3547.       36.
  5   15277    4035    2      6      469.   15266.    3953.       82.
  6   15334    4441    2      6      915.   15328.    4395.       46.
  7   15383    4869    2      6     1341.   15387.    4817.       52.
  8   15475    5453    2      6     1907.   15465.    5377.       76.
  9   15644    6735    2      6     3223.   15647.    6681.       54.
 10   15736    7421    2      6     3901.   15741.    7352.       69.
 11   15809    7838    2      6     4349.   15803.    7796.       43.
 12   16042    9499    3      7     1078.   16034.    9452.       48.
 13   16512    9618    3      8      368.   16431.    9641.       84.
 14   16941    9578    3      8      820.   16882.    9606.       66.
 15   17368    9554    3      8     1268.   17328.    9571.       43.
 16   17811    9507    3      8     1732.   17791.    9535.       35.
 17   18095    8454    3      9     1021.   18112.    8489.       39.
 18   18109    8343    3      9     1127.   18112.    8383.       40.
 19   17929    6962    4     10     1172.   17926.    6913.       49.
 20   16580    6988    4     11     1399.   16521.    6981.       59.
 21   15087    7167    4     11     2913.   15018.    7163.       69.
 22   14282    7260    4     11     3703.   14233.    7258.       49.
 23   13313    7718    5     13      529.   13354.    7699.       45.
 24   12500    8500    5     15      387.   12460.    8542.       58.
 25   11590    9350    5     15     1607.   11564.    9369.       32.
 26   12190   10181    6     18      955.   12182.   10195.       16.
 27   13151   10036    6     18     1521.   12743.   10121.      417.
 27   13151   10036    6     18     1917.   13136.   10069.       36.
 28   13130    9554    6     19      466.   13123.    9601.       47.
 29   13052    9039    6     19     1004.   13041.    9069.       32.
 30   13699    7663    6     21      952.   13830.    7645.      132.
 31   15123    7495    7     22     1176.   15152.    7481.       32.
 32   15948    7393    7     22     2028.   15997.    7379.       51.
 33   16627    7326    7     22     2702.   16667.    7299.       48.
 34   17500    7204    7     22     3590.   17548.    7193.       50.
 35   18345    7054    7     22     4492.   18444.    7085.      103.
 36   18300    5657    8     25      311.   18334.    5647.       35.
BUS NO. 39 OFF ROUTE AT 15,16  TIME:  41:57  FIFTH:  35314.  ODOM:  35554.
BUS NO. 39 OFF ROUTE AT 13,16  TIME:  42: 3  FIFTH:  35402.  ODOM:  35642.
BUS NO. 39 OFF ROUTE AT 15,16  TIME:  42: 4  FIFTH:  35416.  ODOM:  35658.
BUS NO. 39 OFF ROUTE AT 13,16  TIME:  42: 6  FIFTH:  35448.  ODOM:  35690.
BUS NO. 39 OFF ROUTE AT 15,16  TIME:  42: 7  FIFTH:  35466.  ODOM:  35706.
BUS NO. 39 OFF ROUTE AT 13,16  TIME:  42: 9  FIFTH:  35500.  ODOM:  35742.
 41   14638    6127    9     29      445.   14625.    6025.      103.
 42   14717    5780    9     30      266.   14860.    5761.      144.
 43   14816    5222    9     31      656.   14807.    5107.      115.
 44   14055    5037    9     32      795.   14000.    5057.       59.
 45   13388    5138    9     32     1471.   13330.    5145.       59.
*46   12862    5200    9     32     2043.   12762.    5219.      101.
 CT1:RUN039.001

 47   11518    5369   10     33      822.   11531.    5388.       23.
 48   10787    5472   10     33     1556.   10804.    5489.       24.
 49   10462    5513   10     33     1896.   10467.    5536.       24.
 50    9558    5647   10     33     2864.    9509.    5670.       54.
 51    8740    5757   10     33     3632.    8748.    5776.       20.
 52    8145    5840   10     33     4274.    8112.    5864.       41.
 53    7537    6481   11     35      520.    7557.    6437.       49.
```

```
FIXED ROUTE RUN # 40 CHECKPOINT ERRORS   OFF ROUTE DECLARATION

CP#  X(CP)   Y(CP)  SP#   SEG.   INCREM  COMP X   COMP Y   ERROR

  1  12431    4529   1      3      18.  12416.    4602.      75.
  2  12895    3792   1      4     521.  12849.    3812.      51.
  3  13632    3698   1      4    1275.  13596.    3714.      39.
  4  14904    3541   2      5      36.  14881.    3545.      24.
  5  15277    4035   2      6     465.  15265.    3949.      86.
  6  15334    4441   2      6     925.  15329.    4405.      36.
  7  15383    4869   2      6    1343.  15387.    4819.      50.
  8  15475    5453   2      6    1907.  15465.    5377.      76.
  9  15644    6735   2      6    3227.  15648.    6685.      50.
 10  15736    7421   2      6    3913.  15742.    7364.      57.
 11  15809    7838   2      6    4345.  15802.    7792.      47.
 12  16042    9499   3      7    1070.  16033.    9444.      56.
 13  16512    9618   3      8     362.  16425.    9642.      90.
 14  16941    9578   3      8     808.  16870.    9607.      77.
 15  17368    9554   3      8    1264.  17324.    9572.      47.
 16  17811    9507   3      8    1720.  17779.    9536.      43.
 17  18095    8454   3      9    1017.  18112.    8493.      43.
 18  18109    8343   3      9    1125.  18112.    8385.      42.
 19  17929    6962   4     10    1154.  17929.    6931.      31.
 20  16580    6988   4     11    1379.  16541.    6979.      40.
 21  15087    7167   4     11    2881.  15049.    7159.      38.
 22  14282    7260   4     11    3661.  14275.    7253.      10.
 23  13313    7718   5     13     527.  13355.    7697.      47.
 24  12500    8500   5     15     375.  12469.    8534.      46.
 25  11590    9350   5     15    1615.  11558.    9374.      40.
 26  12190   10181   6     18     933.  12160.   10198.      34.
 27  13151   10036   6     18    1895.  13114.   10072.      52.
 28  13130    9554   6     19     436.  13128.    9630.      76.
 29  13052    9039   6     19     978.  13045.    9095.      56.
 30  13699    7663   6     21     932.  13810.    7648.     112.
 31  15123    7495   7     22    1162.  15138.    7483.      19.
 32  15948    7393   7     22    2006.  15976.    7382.      30.
 33  16627    7326   7     22    2684.  16649.    7301.      33.
 34  17500    7204   7     22    3580.  17538.    7194.      40.
 35  18345    7054   7     22    4492.  18444.    7085.     103.
 36  18300    5657   8     25     311.  18334.    5647.      35.
BUS NO. 40 OFF ROUTE AT 13,16  TIME:  44:38  FIFTH:  35436.  ODOM:  35602.
BUS NO. 40 OFF ROUTE AT 15,16  TIME:  44:40  FIFTH:  35500.  ODOM:  35666.
```

```
FIXED ROUTE RUN # 41 CHECKPOINT ERRORS OFF ROUTE DECLARATION

CP#  X(CP)  Y(CP)  SP#  SEG.  INCREM  COMP X  COMP Y  ERROR

  1  12431   4529   1     3      46. 12413.   4574.      49.
  2  12895   3792   1     4     573. 12900.   3806.      15.
  3  13632   3698   1     4    1311. 13632.   3710.      12.
  4  14904   3541   2     5      66. 14910.   3540.       6.
  5  15277   4035   2     6     505. 15271.   3989.      46.
  6  15334   4441   2     6     963. 15334.   4443.       2.
  7  15383   4869   2     6    1379. 15392.   4855.      17.
  8  15475   5453   2     6    1947. 15470.   5417.      36.
  9  15644   6735   2     6    3261. 15652.   6718.      19.
 10  15736   7421   2     6    3951. 15748.   7402.      23.
 11  15809   7838   2     6    4389. 15808.   7835.       3.
 12  16042   9499   3     7    1070. 16033.   9444.      56.
 13  16512   9618   3     8     364. 16427.   9642.      88.
 14  16941   9578   3     8     820. 16882.   9606.      66.
 15  17368   9554   3     8    1264. 17324.   9572.      47.
 16  17811   9507   3     8    1710. 17769.   9537.      52.
 17  18095   8454   3     9    1055. 18112.   8455.      17.
 18  18109   8343   3     9    1133. 18112.   8377.      34.
 19  17929   6962   4    10    1158. 17928.   6927.      35.
 20  16580   6988   4    11    1379. 16541.   6979.      40.
 21  15087   7167   4    11    2887. 15044.   7160.      44.
 22  14282   7260   4    11    3675. 14261.   7255.      22.
 23  13313   7718   5    13     567. 13328.   7727.      18.
 24  12500   8500   5    15     391. 12458.   8545.      62.
 25  11590   9350   5    15    1635. 11543.   9388.      60.
 26  12190  10181   6    18     949. 12176.  10196.      20.
 27  13151  10036   6    18    1905. 13124.  10070.      44.
 28  13130   9554   6    19     446. 13126.   9620.      66.
 29  13052   9039   6    19     982. 13044.   9091.      52.
 30  13699   7663   6    21     916. 13794.   7651.      96.
 31  15123   7495   7    22    1210. 15185.   7477.      65.
 32  15948   7393   7    22    2046. 16015.   7377.      69.
 33  16627   7326   7    22    2720. 16685.   7297.      65.
 34  17500   7204   7    22    3602. 17560.   7191.      62.
 35  18345   7054   7    22    4508. 18460.   7083.     118.
 36  18300   5657   8    25     295. 18349.   5645.      51.
BUS NO. 41 OFF ROUTE AT 13,16  TIME:  50:39  FIFTH:  35356.  ODOM:  35488.
BUS NO. 41 OFF ROUTE AT 15,16  TIME:  50:52  FIFTH:  35460.  ODOM:  35592.
BUS NO. 41 OFF ROUTE AT 13,16  TIME:  50:56  FIFTH:  35562.  ODOM:  35694.
*41  14638   6127   9    29     349. 14637.   6121.       7.
 CT1:RUN041.001

 42  14717   5780   9    30     166. 14760.   5771.      44.
 43  14816   5222   9    31     558. 14820.   5204.      18.
 44  14055   5037   9    32     699. 14095.   5044.      41.
 45  13388   5138   9    32    1375. 13425.   5132.      37.
 46  12862   5200   9    32    1935. 12869.   5205.       9.
 47  11518   5369  10    33     806. 11547.   5385.      33.
 48  10787   5472  10    33    1544. 10816.   5487.      33.
 49  10462   5513  10    33    1870. 10493.   5532.      37.
 50   9558   5647  10    33    2850.  9523.   5668.      41.
 51   8740   5757  10    33    3596.  8784.   5771.      46.
 52   8145   5840  10    33    4256.  8130.   5862.      27.
 53   7537   6481  11    35     528.  7558.   6445.      42.
 54   7652   6971  11    35    1036.  7645.   6945.      27.
 55   8320   6948  11    36     617.  8272.   6954.      49.
 56   9345   6825  11    36    1661.  9307.   6817.      39.
 57   9894   6731  11    36    2213.  9854.   6745.      43.
```

```
FIXED ROUTE RUN # 42 CHECKPOINT ERRORS    OFF ROUTE DECLARATION

CP#   X(CP)   Y(CP)   SP#   SEG.   INCREM  COMP X   COMP Y    ERROR

  1  12431    4529    1      3       8.  12417.    4612.      84.
  2  12895    3792    1      4     529.  12857.    3811.      43.
  3  13632    3698    1      4    1277.  13598.    3714.      37.
  4  14904    3541    2      5      20.  14865.    3548.      40.
  5  15277    4035    2      6     451.  15263.    3936.     100.
  6  15334    4441    2      6     913.  15327.    4393.      48.
  7  15383    4869    2      6    1329.  15385.    4805.      64.
  8  15475    5453    2      6    1897.  15464.    5368.      86.
  9  15644    6735    2      6    3211.  15645.    6669.      66.
 10  15736    7421    2      6    3897.  15740.    7348.      73.
 11  15809    7838    2      6    4333.  15801.    7780.      59.
 12  16042    9499    3      7    1068.  16032.    9442.      58.
 13  16512    9618    3      8     354.  16417.    9642.      98.
 14  16941    9578    3      8     806.  16868.    9607.      79.
 15  17368    9554    3      8    1252.  17312.    9573.      59.
 16  17811    9507    3      8    1702.  17761.    9538.      59.
 17  18095    8454    3      9     995.  18112.    8515.      63.
 18  18109    8343    3      9    1107.  18112.    8403.      60.
 19  17929    6962    4     10    1168.  17927.    6917.      45.
 20  16580    6988    4     11    1379.  16541.    6979.      40.
 21  15087    7167    4     11    2889.  15042.    7160.      46.
 22  14282    7260    4     11    3675.  14261.    7255.      22.
 23  13313    7718    5     13     549.  13341.    7714.      28.
 24  12500    8500    5     15     399.  12452.    8550.      70.
 25  11590    9350    5     15    1621.  11553.    9378.      46.
 26  12190   10181    6     18     963.  12190.   10194.      13.
 27  13151   10036    6     18    1903.  13122.   10071.      45.
 28  13130    9554    6     19     458.  13125.    9608.      55.
 29  13052    9039    6     19    1006.  13040.    9067.      30.
 30  13699    7663    6     21     960.  13838.    7644.     140.
 31  15123    7495    7     22    1166.  15142.    7483.      22.
 32  15948    7393    7     22    2008.  15978.    7382.      32.
 33  16627    7326    7     22    2694.  16659.    7300.      41.
 34  17500    7204    7     22    3592.  17550.    7192.      52.
 35  18345    7054    7     22    4496.  18448.    7084.     107.
 36  18300    5657    8     25     253.  18391.    5640.      93.
BUS NO. 42 OFF ROUTE AT 15,16   TIME:   40:16   FIFTH:   35306.  ODOM:   35478.
 41  14638    6127    9     29     335.  14639.    6134.       8.
 42  14717    5780    9     30     154.  14748.    5772.      33.
 43  14816    5222    9     31     540.  14822.    5222.       6.
 44  14055    5037    9     32     693.  14101.    5043.      46.
 45  13388    5138    9     32    1361.  13439.    5130.      51.
 46  12862    5200    9     32    1923.  12881.    5204.      20.
 47  11518    5369   10     33     812.  11541.    5386.      29.
 48  10787    5472   10     33    1552.  10808.    5488.      27.
 49  10462    5513   10     33    1900.  10463.    5536.      24.
 50   9558    5647   10     33    2872.   9501.    5671.      62.
 51   8740    5757   10     33    3646.   8734.    5778.      21.
 52   8145    5840   10     33    4272.   8114.    5864.      39.
 53   7537    6481   11     35     494.   7553.    6411.      72.
 54   7652    6971   11     35    1008.   7640.    6918.      55.
 55   8320    6948   11     36     589.   8244.    6958.      77.
 56   9345    6825   11     36    1619.   9265.    6823.      80.
*57   9894    6731   11     36    2189.   9830.    6748.      66.
 CT1:RUN042.001

 58  12136    6444   11     37    1162.  12112.    6447.      24.
 59  12561    6405   11     37    1576.  12523.    6393.      40.
```

FIXED ROUTE RUN # 43 CHECKPOINT ERRORS OFF ROUTE DECLARATION

```
CP#  X(CP)  Y(CP)  SP#  SEG.  INCREM  COMP X  COMP Y  ERROR

  1  12431   4529   1     3     22. 12415.   4598.     71.
  2  12895   3792   1     4    537. 12865.   3810.     36.
  3. 13632   3698   1     4   1287. 13608.   3713.     28.
  4  14904   3541   2     5     24. 14869.   3547.     36.
  5  15277   4035   2     6    457. 15264.   3942.     94.
  6  15334   4441   2     6    911. 15327.   4391.     50.
  7  15383   4869   2     6   1335. 15386.   4811.     58.
  8  15475   5453   2     6   1905. 15465.   5376.     78.
  9  15644   6735   2     6   3223. 15647.   6681.     54.
 10  15736   7421   2     6   3899. 15741.   7350.     71.
 11  15809   7838   2     6   4349. 15803.   7796.     43.
 12  16042   9499   3     7   1070. 16033.   9444.     56.
 13  16512   9618   3     8    366. 16429.   9642.     86.
 14  16941   9578   3     8    814. 16876.   9607.     71.
 15  17368   9554   3     8   1264. 17324.   9572.     47.
 16  17811   9507   3     8   1712. 17771.   9537.     50.
 17  18095   8454   3     9    989. 18112.   8521.     69.
 18  18109   8343   3     9   1115. 18112.   8395.     52.
 19  17929   6962   4    10   1150. 17929.   6934.     28.
 20  16580   6988   4    11   1379. 16541.   6979.     40.
 21  15087   7167   4    11   2885. 15046.   7160.     42.
 22  14282   7260   4    11   3653. 14283.   7252.      8.
 23  13313   7718   5    13    551. 13339.   7715.     26.
 24  12500   8500   5    15    411. 12443.   8558.     82.
 25  11590   9350   5    15   1633. 11544.   9387.     58.
 26  12190  10181   6    18    939. 12166.  10197.     29.
 27  13151  10036   6    18   1901. 13120.  10071.     47.
 28  13130   9554   6    19    440. 13127.   9626.     72.
 29  13052   9039   6    19    986. 13043.   9087.     48.
 30  13699   7663   6    21    942. 13820.   7647.    122.
 31  15123   7495   7    22   1180. 15156.   7481.     35.
 32  15948   7393   7    22   2022. 15992.   7380.     45.
 33  16627   7326   7    22   2698. 16663.   7299.     45.
 34  17500   7204   7    22   3590. 17548.   7193.     50.
 35  18345   7054   7    22   4494. 18446.   7085.    105.
 36  18300   5657   8    25    301. 18343.   5646.     45.
BUS NO. 43 OFF ROUTE AT 13,16  TIME:  41: 5  FIFTH:  35406.  ODOM:  35576.
BUS NO. 43 OFF ROUTE AT 15,16  TIME:  41: 9  FIFTH:  35478.  ODOM:  35650.
BUS NO. 43 OFF ROUTE AT 13,16  TIME:  41:11  FIFTH:  35510.  ODOM:  35680.
 41  14638   6127   9    29    443. 14625.   6027.    101.
 42  14717   5780   9    30    264. 14858.   5761.    142.
 43  14816   5222   9    31    654. 14808.   5109.    113.
 44  14055   5037   9    32    797. 13998.   5057.     61.
 45  13388   5138   9    32   1469. 13332.   5144.     57.
 46  12862   5200   9    32   2033. 12772.   5218.     91.
 47  11518   5369  10    33    744. 11608.   5377.     91.
 48  10787   5472  10    33   1476. 10883.   5478.     96.
 49  10462   5513  10    33   1820. 10543.   5525.     82.
 50   9558   5647  10    33   2782.  9590.   5658.     34.
 51   8740   5757  10    33   3560.  8819.   5766.     80.
 52   8145   5840  10    33   4202.  8184.   5855.     41.
 53   7537   6481  11    35    490.  7552.   6407.     75.
 54   7652   6971  11    35   1012.  7641.   6922.     51.
 55   8320   6948  11    36    589.  8244.   6958.     77.
 56   9345   6825  11    36   1627.  9273.   6822.     72.
 57   9894   6731  11    36   2179.  9820.   6750.     76.
```

4.3 FIXED ROUTE DATA PROCESSING REQUIREMENTS

During the recording of fixed route data, a number of manual entry errors occured. These errors are noted in Table 4.3-1. The resulting card input changes necessary for processing these data are delineated in Table 4.3-2.

FIXED ROUTE DATA PROCESSING ANOMALIES

RUN NO.	PROBLEM	SOLUTION
14	Missed TA16	Inserted at approximate fifth wheel reading
14	TD15 entered early	Deleted first occurrence of TD15
15	CP25 entered early	Deleted first occurrence of CP25
17	Missed TD11	None, event not processed
18	Missed CP43	None, event not processed
19	Couldn't process tape	None, event not processed
20	Missed CP37	None, event not processed
	Generator stalled after CP46	None, not processed by FRTEN and FRSYS
21	Entered CP66 for CP6	Replaced CP66 with CP6
	Entered CP26 early	Deleted first CP26
	Entered CP47 early	Deleted first CP47
	Entered CP111 for CP11	Replaced CP111 with CP 11
	Missed CP36, CP47 and CP49	None, events not processed
	Entered TA16 for TA6	Replaced TA16 with TA6
24	TA33 entered for TA3	Replaced TA33 with TA3
24	TD12 entered early	Delete first TD12
26	Missed TD15	None, event not processed
27	TD10 entered for TA10	Replaced TD10 with TA10
27	Missed CP48	None, event not processed
28	Missed CP9	None, event not processed
29	Missed CP1 and CP28	None, event not processed
31	5th Wheel problem between CP3 and CP4	None, data processed
32	Lost magnet from 5th wheel	None, not processed by FRSYS or FRTEN
33	Couldn't process tape	None, not processed
34	Garbage record after CP37	None, CP38-CP76 processed manually
34	DO2, DC2, and TD2 entered early	Deleted first DO2, DC2, and TD2
37	DC7 entered for DC1	Deleted DC7
37	CP30 entered twice	Deleted second CP30
38	CP71 entered early	Delete first CP71
39	CP27 entered early	Delete first CP27
40	Couldn't process past CP40 due to bad record	None, CP41-76 processed manually
42	CP40 entered in error	Delete first CP40
43	Couldn't process past CP62 with FRLS	None, CP63-76 processed manually

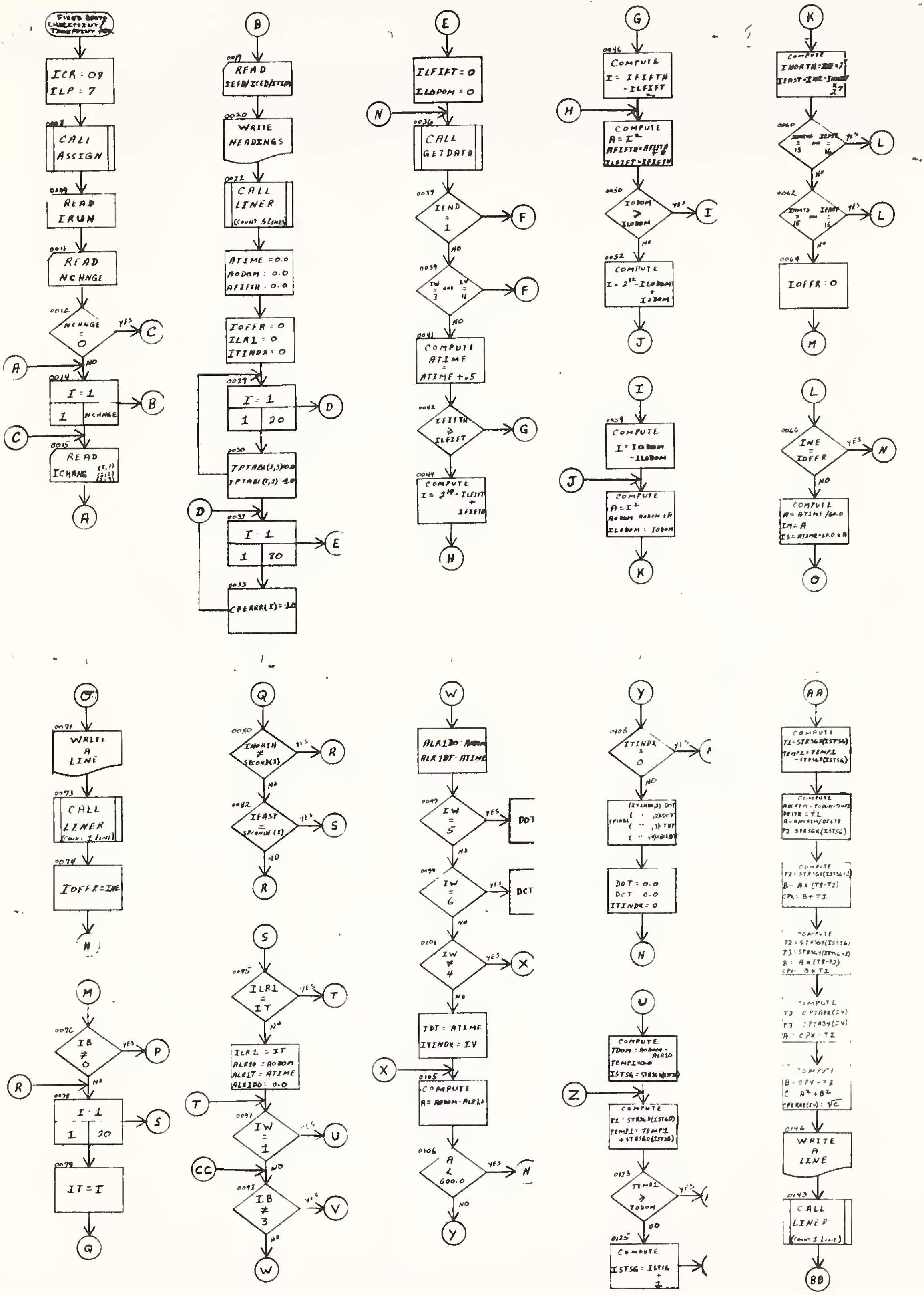
CARD INPUT CHANGES FOR HI^3 DATA PROCESSING

RUN	CHANGES	FRLS	FRSYS/ FRTEN	RECORDED ON LOG SHEET
14	Insert TA16 at FIFTH = 33678	N.A.		Yes
16	Change 2nd TD11 to TA24	N.A.		Yes
21	Delete 1st CP7			Yes
21	Replace CP66 with CP6			Yes
21	Delete 1st CP26			Yes
21	Replace 1st TA16 with TA6	N.A.		Yes
21	Replace CP111 with CP11			Yes
21	Delete 1st CP47			Yes
24	Delete TA33	N.A.		No, but EE33 on tape
27	Replace 1st TD10 with TA10			No, observed on listing
30	Replace 2nd CP10 with TA10			Yes
32	Replace 1st TD13 with DO13		N.A.	No, observed on listing
34	Delete 1st DO2		N.A.	Yes
34	Delete 1st DC2		N.A.	Yes
34	Delete 1st TD2		N.A.	Yes
34	Delete CP128			Not entered by operator, Error record
37	Delete 1st DC7		N.A.	No, observed on listing
37	Delete 2nd CP30			Yes
38	Delete 1st CP71			Yes
39	Replace 2nd TA18 with TA19	N.A.		No, observed on listing
39	Delete 1st CP27			Yes
42	Delete 1st CP40			Yes
42	Delete 1st TD5		N.A.	Yes

4.4 FRLS AND FRSYS FLOW CHARTS

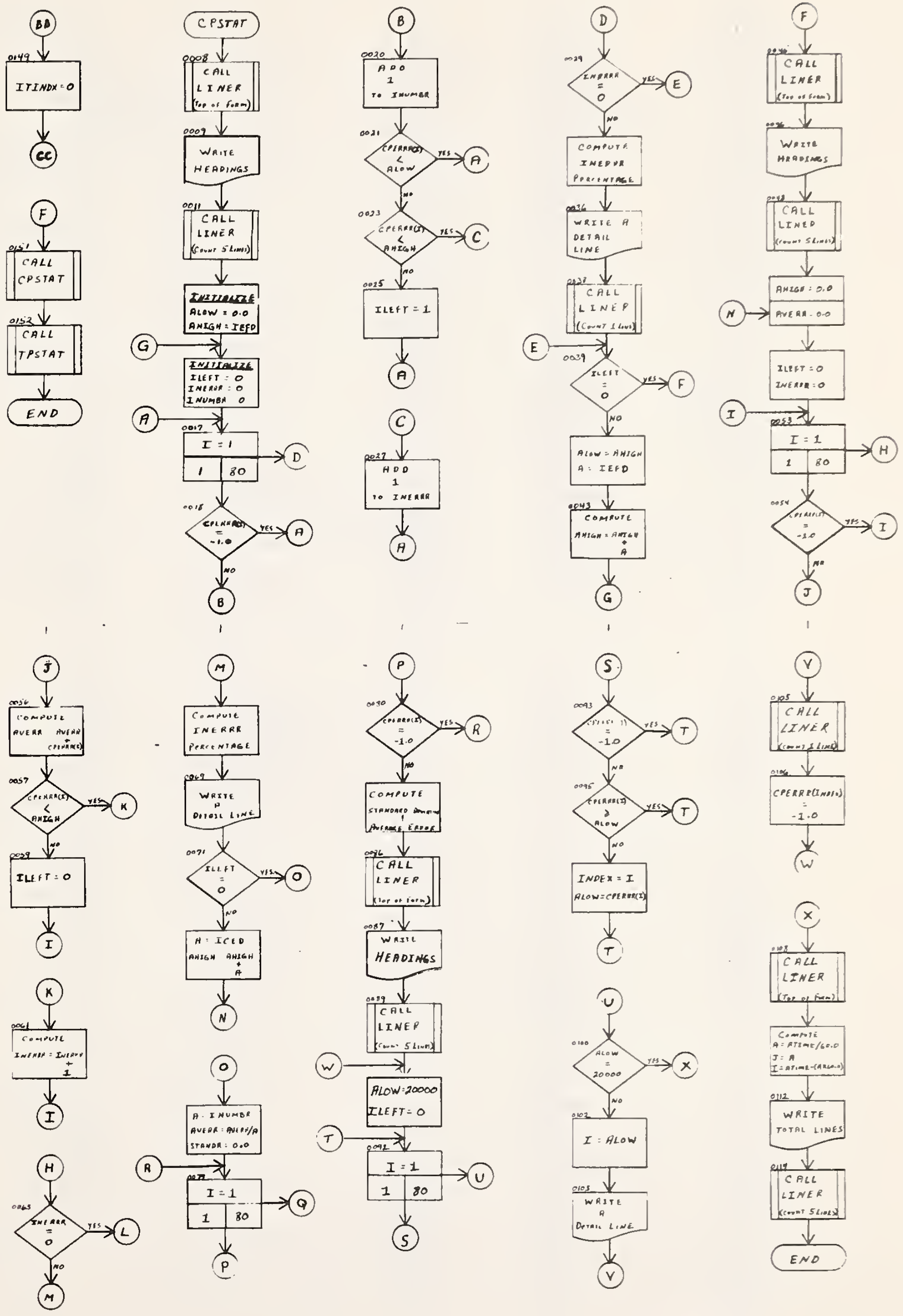
Flow charts of computer programs CPMAIN and RRSL were included in Section 4 of Volume I. Flow charts of computer programs FRLS and FRSYS are presented in this subsection. Detailed software documentation of all Phase I software were delivered under separate cover to TSC and MITRE.

FLOW CHART OF PROGRAM FRIS

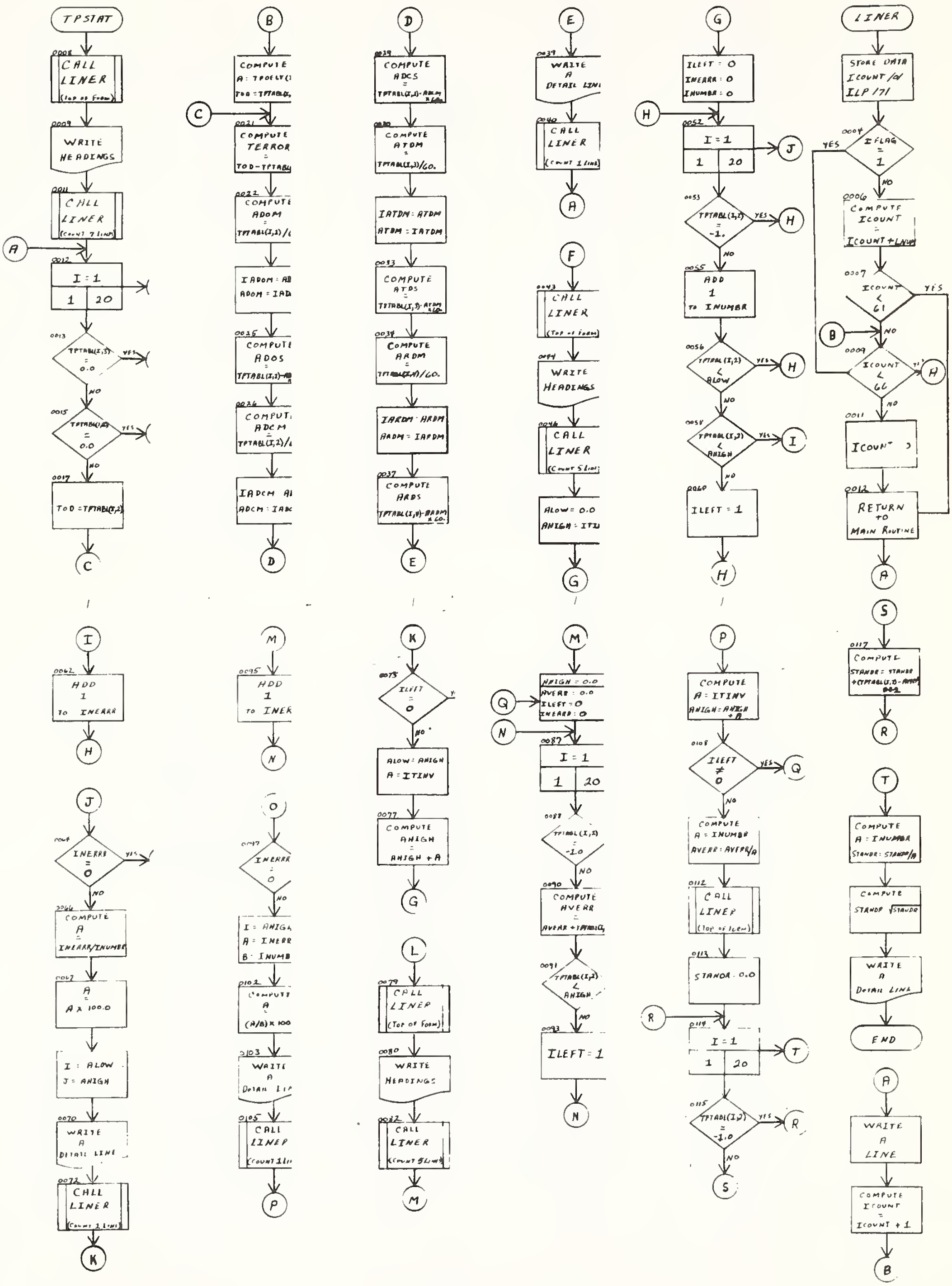


FIXED BOOTS CHECKPOINT TEMPORARY
ICR = 08
ILP = 7
0008 CALL ASSIGN
0009 READ IRUN
0011 READ NCHNGE
0012 NCHNGE = 0
YES
NO
0014 I = 1 1 NCHNGE
0015 READ ICHANG (I,1) (I,2)
0019 READ IEFD/ICED/ITLD
0020 WRITE HEADINGS
0022 CALL LINER (COUNT 5 LINES)
ATIME = 0.0
AODOM = 0.0
AFIFTH = 0.0
IOFFR = 0
ILR1 = 0
ITINDX = 0
0029 I = 1 1 20
0030 TPTABL(I,3) = 0
TPTABL(I,2) = 10
0032 I = 1 1 80
0033 CPERRR(I) = 10
ILFIFT = 0
ILODOM = 0
0036 CALL GETDATA
0037 IEND = 1
0039 IW = 3 and IV = 11
0041 COMPUTE ATIME = ATIME + .5
0042 IFIFTH ≥ ILFIFT
0044 COMPUTE I = 2^16 - ILFIFT + IFIFTH
0046 COMPUTE I = IFIFTH - ILFIFT
COMPUTE A = I^2 AFIFTH = AFIFTH + A ILFIFT = IFIFTH
0050 IODOM ≥ ILODOM
0052 COMPUTE I = 2^16 - ILODOM + IODOM
0054 COMPUTE I = IODOM - ILODOM
COMPUTE A = I^2 AODOM = AODOM + A ILODOM = IODOM
COMPUTE INORTH = ... IEAST = ...
0060 ... = 13 ... = 14
0062 ... = 15 ... = 16
0064 IOFFR = 0
0066 INE = IOFFR
COMPUTE A = ATIME/60.0 IM = A IS = ATIME - 60.0 * A
0071 WRITE A LINE
0073 CALL LINER (COUNT 1 LINE)
0074 IOFFR = INE
0076 IB ≠ 0
0078 I = 1 1 20
0079 IT = I
0080 INORTH ≠ SPCONE(I)
0082 IEAST = SPCONE(I)
0085 ILR1 = IT
ILR1 = IT ALR1O = AODOM ALR1T = ATIME ALR1DO = 0.0
0091 IW = 1
0093 IB ≠ 3
ALR1DO = AODOM ALR1DT = ATIME
0097 IW = 5
DOT
0099 IW = 6
DCT
0101 IW ≠ 4
TDT = ATIME ITINDX = IV
0105 COMPUTE A = AODOM - ALR1O
0106 A < 600.0
0108 ITINDX = 0
TPTABL (ITINDX,3) = DOT (ITINDX,2) = DCT (ITINDX,1) = TDT (ITINDX,4) = ...
DOT = 0.0 DCT = 0.0 ITINDX = 0
COMPUTE TDOM = AODOM - ALR1O TEMP1 = 0.0 ISTSG = ...
COMPUTE T1 = STRSGD(ISTSG) TEMP1 = TEMP1 + STRSGD(ISTSG)
0123 TEMP1 > TODOM
0125 COMPUTE ISTSG = ISTSG + 1
COMPUTE T1 = STRSGD(ISTSG) TEMP1 = TEMP1 - STRSGD(ISTSG)
COMPUTE A = ... DELTR = T1 A = ... /DELTR T2 = STRSGX(ISTSG)
COMPUTE T2 = STRSGX(ISTSG-1) B = A × (T3 - T2) CPX = B + T2
COMPUTE T2 = STRSGY(ISTSG) T3 = STRSGY(ISTSG-1) B = A × (T3 - T3) CPY = B + T2
COMPUTE T2 = CPTABX(IV) T3 = CPTABY(IV) A = CPX - T2
COMPUTE B = CPY - T3 C = A² + B² CPERRR(IV) = √C
0146 WRITE A LINE
0148 CALL LINER (COUNT 1 LINE)
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA BB CC

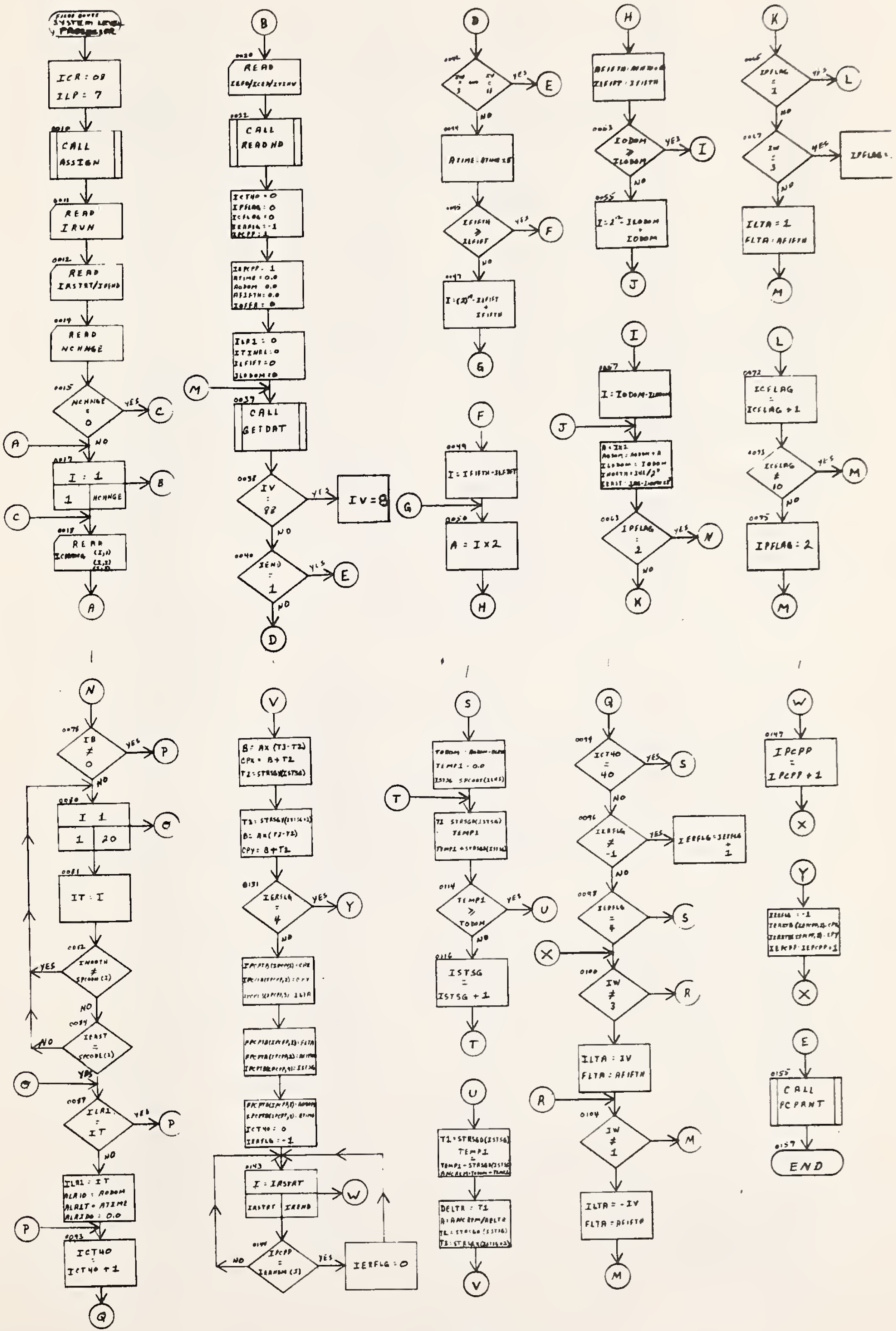
FLOW CHART OF PROGRAM FRLS (CONT'D)



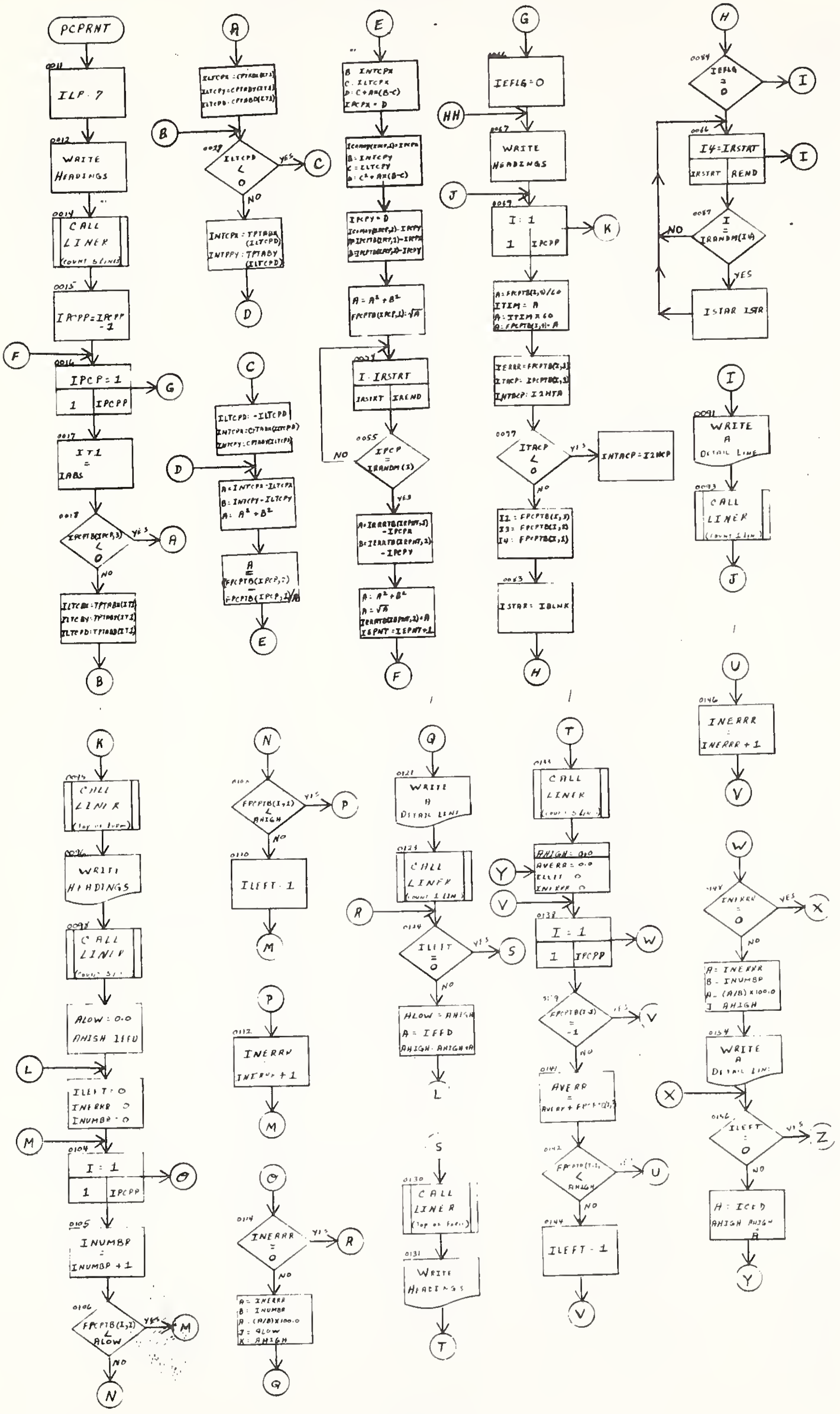
FLOW CHART OF PROGRAM FRLS (CONT'D)



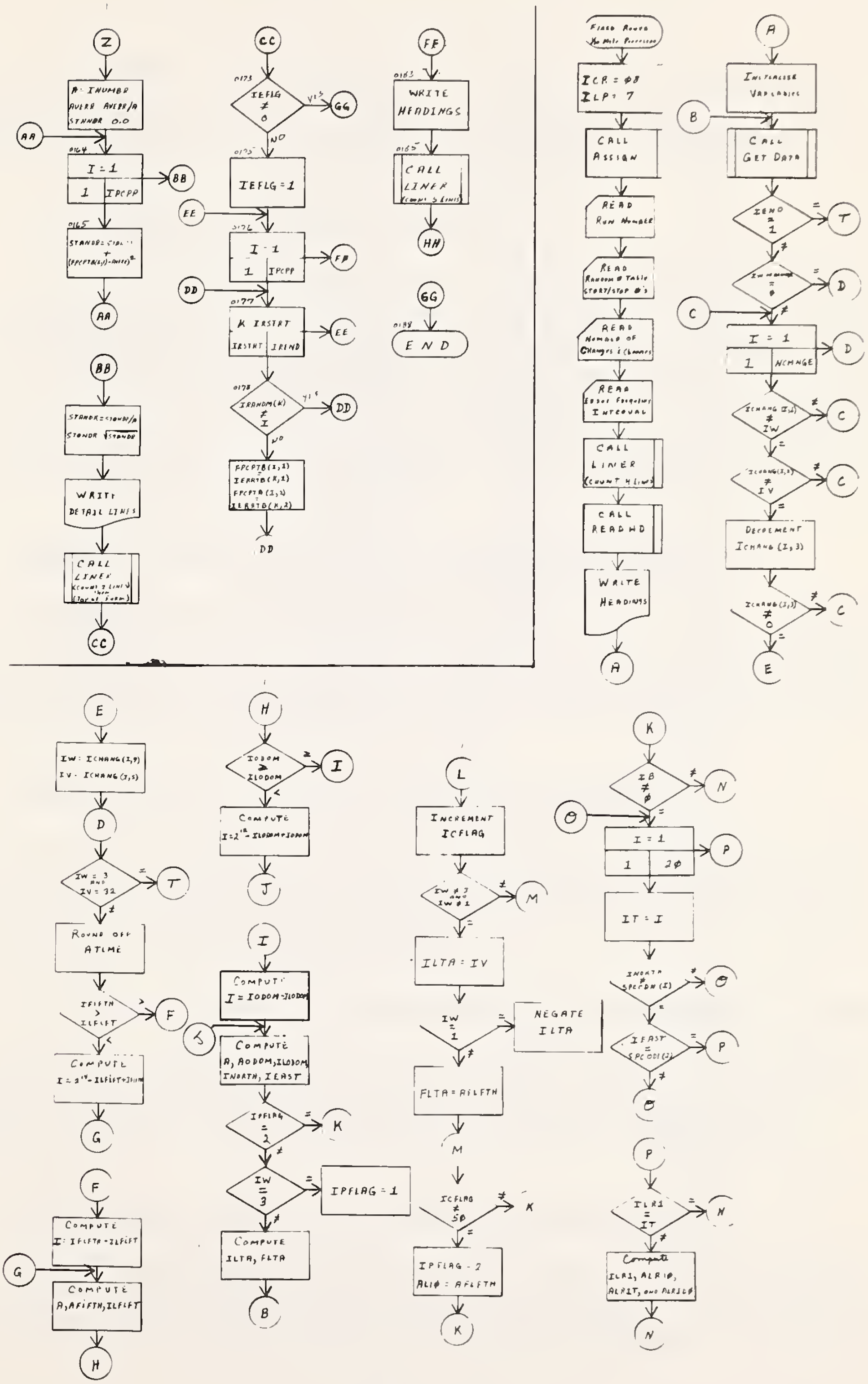
FLOW CHART OF PROGRAM FRSYS



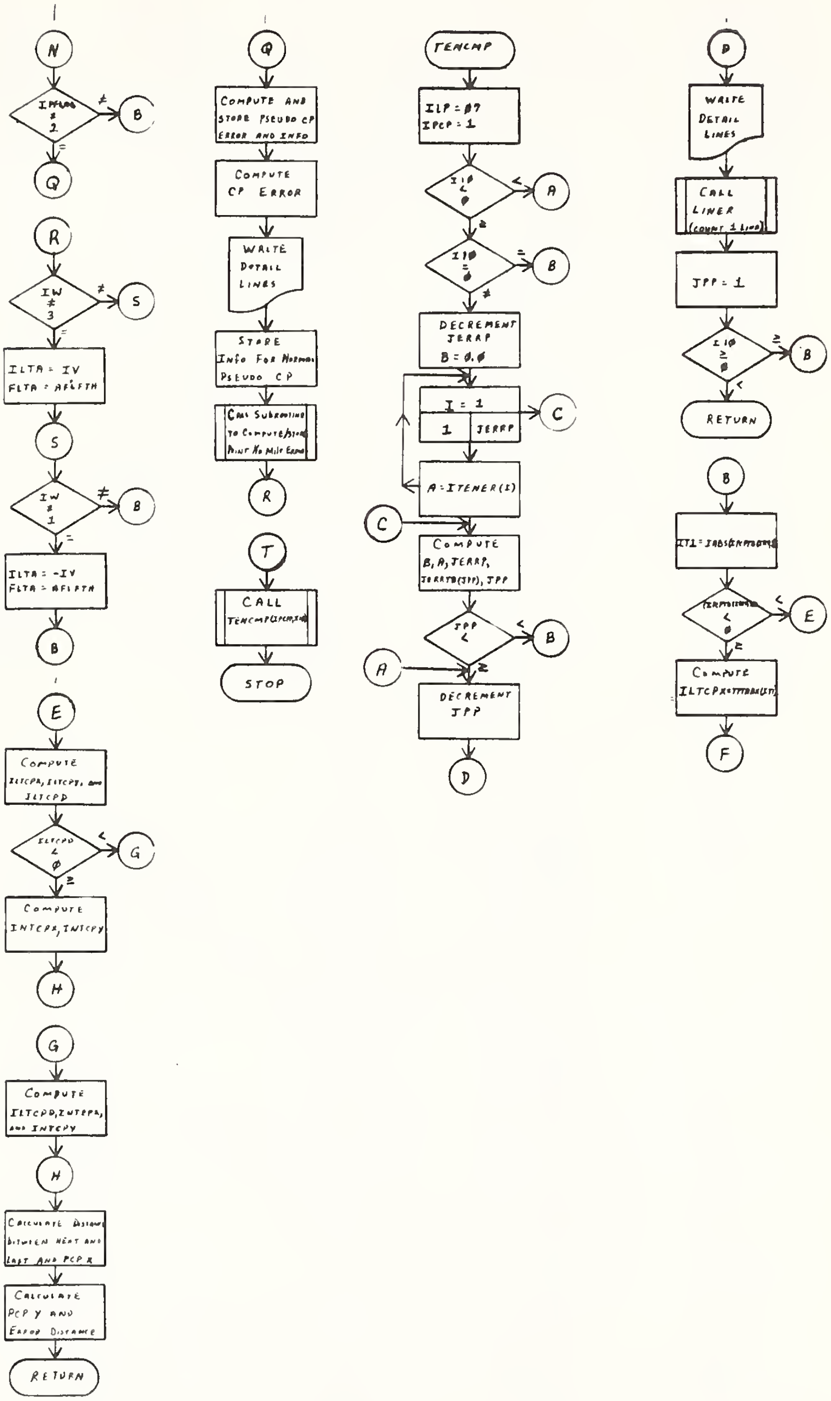
FLOW CHART OF PROGRAM FRSYS (CONT'D)



FLOW CHART OF PROGRAM FRSYS (CONT'D) AND FRTEN



FLOW CHART OF PROGRAM FRTEN (CONT'D)



5. REPORT OF INVENTIONS APPENDIX

After a diligent review of the work performed under this contract, no innovation, discovery, or invention was made; however, a number of previous concepts were practically demonstrated for the first time. The previous concepts demonstrated are briefly described below.

1. Use of Signposts Operating at 49.86 MHz

Operation of signposts at 49.86 MHz was conceived by HI^3 at the time the FCC proposed to open the 49 MHz band for use under Part 15. Operation in this band was formally authorized on 12 February 1976 under FCC Docket 20119. Use of this frequency was formally proposed to be tested during Phase I in Hoffman's response to TSC questions dated 15 April 1976. The use of 49.86 MHz signposts is described on pages 3-1 to 3-6 and 10-6 and 10-7 of Volume I. The first practical demonstration of the use of signposts operating at 49.86 MHz was performed under this contract.

2. Hole-Filling Technique for Use with Overlapping Signposts

The use of a double grid of signposts to fill in the holes left when only a single grid is used was first proposed by Hoffman in 1975 for use with the Cargo Security System and again in 1975 for use with the Dallas AVM system. However, the concept was not practically demonstrated until Phase I of this contract. Figure 3-14 on page 3-26 of Volume I illustrates this concept.

3. Automatic Reset of Odometer Using Region 1 of Signpost

The concept of resetting the odometer automatically using Region 1 of the signpost was proposed as part of Hoffman's proposal dated 14 October 1975. It was first practically demonstrated under this contract. The concept is described on pages 6-8, 6-12, 6-13, and 7-4 of Volume I.

4. Determination of Time Point Passage Through Use of the Region 1 Dropout

The concept of using Region 1 dropout to determine time point passage was proposed as part of Hoffman's proposal dated 14 October 1975. It was first practically demonstrated under this contract. The concept is described on pages 6-12, 6-13, 6-14, 6-15, and 7-7 of Volume I.

5. Random Route and Fixed Route Data Recording Software

The software used to record random route and fixed route vehicle location data on cassettes was developed during Phase I of this contract. This software is described on pages 3-19, 3-20, 6-6, 6-7, 6-8, and 6-9 of Volume I.

6. Interface Control Unit (ICU) Hardware

The Interface Control Unit was developed under this contract for the express purpose of recording AVL data on cassette. The ICU is described on pages 3-16 through 3-19 and 6-1 through 6-6 of Volume I.

7. Random Route and Fixed Route Data Processing Software

The random route and fixed route data processing software, consisting of computer programs CPMAIN, RRSL, RRTEN, FROUTE, FRSYS, and FRTEN, were developed under this contract. The algorithms used for automatic vehicle location were not developed under this contract; however, the algorithms which were associated with generating a reference location from the fifth-wheel and turn indications were developed under this contract. Software is described in Sections 3, 4, 6, and 7 of Volume I.

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